Response ID:484 Data

1. BOSC 2017 Nominations

Self Nomination:

Yes

Nominator Information

First Name

Last Name

Nominator Title

Street Address

City

State

Postal Code

Email Address

Phone Number

Mobile Phone

Nominee Information

First Name

Richard

Last Name

Di Giulio

Nominee Title

Professor

Street Address

Exemption 6

City

Exemp

State

Exemption 6

Postal Code

Exem

Email Address

richd@duke.edu

Phone Number

Exemption 6

Mobile Phone

Exemption 6

Employment Information

Place of Employment/Work:

Duke University

Work Street Address

Reaesrach Drive

Work City

Durham

Work State:

North Carolina

Work Postal Code

27708-0328

Work Phone Number

919-613-8024

Work Email Address

richd@duke.edu

Sector

Academia

Qualifications

Primary Area(s) of Expertise

Environmental Toxicology
Ecotoxicology
Risk Assessment

Committee Preference(s)

Executive Committee
Air, Climate, and Energy Subcommittee
Chemical Safety for Sustainability and Human Health Risk Assessment Subcommittee
Safe and Sustainable Water Resources Subcommittee

Statement of Interest

I am particularly interested in the effects, including mechanisms, of environmental pollutants on aquatic organisms and humans, and broadly on interconnections between ecological and human health.

Skills/qualifications related to committee preference(s) specified

35 years of research experience related to interests above.
15 years experience as Director of Duke's Superfund Research Center (supported by NIEHS).
15 years experience as Director of Duke's University Program in Environmental Health (graduate training program, supported by NIEHS).
8 years experience as Co-PI of Duke's Center for the Environmental Implications of Nanotechnology (supported by NSF and EPA).

Other Relevant Information

CV/Resume URL

2. CV/Resume

Please upload your CV/ Resume.

Di_Giulio_CV.doc

3.

BOSC Nomination

Jun 23, 2017 09:44:42 Success: Email Sent to: tracy.tom@epa.gov

4. Thank You for your Submission!

June, 2017

CURRICULUM VITAE

NAME: Richard Thomas Di Giulio

CURRENT POSITION: Sally Kleberg Professor of Environmental Toxicology
Nicholas School of the Environment
Department of Civil and Environmental Engineering (secondary)
Duke University

ADDRESS: Office: Nicholas School of the Environment
Box 90328
Duke University
Durham, North Carolina 27708-0328
(9l9) 613-8024
Email: richd@duke.edu

Home: 3908 Tyndrum Drive
Durham, North Carolina 27705
(919) 489-5791

PERSONAL DATA: Born: 13 October 1950

EDUCATION: Ph.D., Virginia Polytechnic Institute and State University, 1982
M.S., Louisiana State University, 1978
B.A., University of Texas at Austin, 1972

PROFESSIONAL EXPERIENCE:

Sally Kleberg Distinguished Professor, Nicholas School of the Environment, Duke University, 2016 – present
Chair, Environmental Science and Policy Division, Nicholas School of the Environment, July, 2016 - present
Professor, Nicholas School of the Environment, Duke University, 1998 – 2016
Secondary Professor, Pratt School of Engineering, Duke University, 2012 - present
Director, Duke University Superfund Research Center, 2000 - present
Director, University Program in Environmental Health, Duke University, 2001 – present
Director, Center for Comparative Biology of Vulnerable Populations, 2005 - 2010
Associate Professor, School of the Environment, Duke University, 1991-98
Assistant Professor, School of Forestry and Environmental Studies, Duke University, 1985 - 1991
Assistant Professor and Research Associate, School of Forestry and Environmental Studies, Duke University, 1982-85

SOCIETY MEMBERSHIPS:

Society of Environmental Toxicology and Chemistry
Society of Toxicology

Phi Kappa Phi
Sigma Xi

AWARDS:

Professor of the Year, 1984-85. Awarded annually by graduate students of the School of Forestry and Environmental Studies, Duke University.

The A. B. Massey Honorarium, 1982. Awarded to outstanding graduate student in Department of Fisheries and Wildlife Science, VPI&SU.

College of Agriculture and Life Sciences Fellowship, VPI&SU, 1978-1981. Awarded to top 10 graduate applicants in 1978.

National Wildlife Federation Fellowship Awards, 1980-1981 and 1981-1982.

KEY PROFESSIONAL ACTIVITIES:

Member, External Advisory Board, Environmental Health Science Center (P30), Texas A&M University, March, 2016 – present.

Member, U.S. EPA Scientific Advisory Board Lake Erie Phosphorous Objectives Review Panel, November 1, 2014 – present.

Member, Editorial Review Board, Journal of Exposure Science and Environmental Epidemiology, June, 2013 – present.

Member, U.S. EPA Scientific Advisory Board, Ecological Processes and Effects Committee, November, 2011 – present.

Member, Qualifications Review Board, for selection of Editor-in-Chief, Environmental Health Perspectives, April, 2014 – October, 2015.

Member, U.S. Department of Defense, Strategic Environmental Research and Development Program, Scientific Advisory Board, October, 2011 – July, 2015.

Associate Editor, Environmental Health Perspectives, January 2008 – present.

Member, NIEHS Review Committee, Superfund Research Program, August – November, 2012.

Member, NIEHS Review Committee, International Collaborations in Environmental Health, May – July, 2012.

Member, Committee on Human and Environmental Exposure in the 21st Century. The National Academy of Science, National Research Council, Washington, D.C. March, 2010 – November, 2012.

Member, Computational Toxicology Committee, Board of Scientific Counselors, U.S. EPA, Washington, D.C. December 2004 – July, 2013.

Member, Executive Committee, North Carolina Center of Innovation for Marine Biotechnology, January, 2008 – March, 2009.

Associate Editor, Toxicological Sciences, January 2004 – December, 2007.

Member, Review Committee, U.S. EPA Safe Pesticides, Safe Products Program, Board of Scientific Counselors, February – May, 2007.

Member, Committee on Assessment of the Health Implications of Exposure to Dioxin. The National Academy of Science, National Research Council, Washington, D.C. October, 2004 – October, 2006.

Member, Nomination Committee, Society of Environmental Toxicology and Chemistry, 1991 – 1993, and 2003 - 2006.

Member, Review Team for U.S. Army Environmental Health Research Center, Fort Dietrick, MD, June, 2003.

Member, Contaminated Sediments Science Plan Review Committee, U.S. EPA, Scientific Advisory Board, October, 2002 – March, 2003.

Member, Review Committee, NIEHS Environmental Health Science Center, SUNY, Stony Brook, May, 2001.

Member, Review Team for the Board of Scientific Counselors, U.S. EPA, to review the National Center for Environmental Research (NCER), October – December, 1997, and September, 2001 – March, 2002.

Member, Expert Advisory Committee, Canadian Network of Toxicology Centres, January, 1998 – March, 2003.

Consultant, U.S. EPA, Scientific Advisory Board, February, 1991 - present.

Member, Review Committee, Hudson River Foundation, NYC, NY, January, 2000 and October, 2001 – March, 2002.

Member, Advisory Council, Chesapeake Ecotox Research Consortium (a consortium of Maryland and Virginia scientists), January, 2000 – October, 2001.

Member, Board of Directors and Chair, Membership Committee, Society of Environmental Toxicology and Chemistry (SETAC), November, 1995 – November, 1998.

Member, Program Committee, SETAC 19th Annual Meeting, November 15-19, 1998, Charlotte, NC (Chair, Plenary Session).

Member, Academic Advisory Board, Ecotoxicology Program, University of California-Davis, 1992 - 1997.

Secretary-Treasurer, Society of Toxicology, North Carolina Chapter, April, 1994 - April, 1996.

Member, U.S. EPA Environmental Biology Peer Review Panel, Office of Exploratory Research. Reviews attended: Gatlinburg, TN, May 18-20, 1988; New Orleans, LA, February 21-23, 1990; Fort Worth, TX, May 29-31, 1990; Portland, OR, July 18-20, 1990; Tempe, AZ, December 13-15, 1990; Washington, D.C., June 2-4, 1991; Knoxville, TN, June 27-29, 1991; Fort Worth, TX, January 12-14, 1995; Washington, DC, August 28, 1996 (Drinking Water Disinfection By-Products).

Member, Site Review Team, U.S. EPA-sponsored Environmental Research Centers, June - August, 1991.

Member, Technical Committee, Society of Environmental Toxicology and Chemistry, November, 1987 - 1991.

Member, Board of Directors, and Secretary, Carolinas Chapter of the Society of Environmental Toxicology and Chemistry, August 1991 - December, 1993.

Member, Editorial Board, Human and Ecological Risk Assessment, January, 1995 – December, 2005.

Member, Editorial Board, Toxicological Sciences, January, 2000 – 2003.

Member, Policy Board, Ecotoxicology Section, Chemosphere, March, 1989 – December, 2002.

Member, Editorial Board, Environmental Health Perspectives, March, 1993 – December, 2000.

Member, Editorial Board, Ecotoxicology, August, 1991 – December, 2000.

Member, Editorial Board, Environmental Toxicology and Chemistry, November, 1987 - December, 1990 and January, 1994 - December, 1996.

Reviewer (last 5 years) for Aquatic Toxicology, Archives of Environmental Contamination and Toxicology, Comparative Biochemistry and Physiology, Ecological Applications, Environmental Health Perspectives, Environmental Science and Technology, Environmental Toxicology and Chemistry, Human and Environmental Risk Assessment, Journal of Toxicology and Environmental Health, Marine Biology, Marine Environmental Research, Toxicological Pathology, and Toxicological Sciences.

Member, Biological Monitoring Task Force, North Carolina Department of Environment, Health, and Natural Resources. October, 1990 - March 1993.

Member, Fish Tumor Task Force, September, 1985 - August, 1988. Dr. John Hickey, U.S. "Fish and Wildlife Service, Cortland, NY, Director.

Member, North Carolina Coastal Energy Impact Program Research Team, "Cumulative Impacts of Peat Mining," July, 1983 - July, 1984.

MAJOR CONFERENCES AND WORKSHOPS:

Invited Participant and Speaker, Elizabeth Project Sediment Remediation Partnership, Portsmouth, VA, November 3, 2016.

Invited Participant and Speaker, Tri Services Environmental Risk Assessment Work Group, Portsmouth, VA, September 14, 2016.

Invited Participant and Speaker, Invited Participant, Aggregate Exposure Pathway Workshop, May 9-11, 2016, U.S. EPA NHEERL, RTP, NC.

Organizer and Speaker, The Toxicity of Power Symposium, sponsored by Duke University ITEHP and Superfund Research Center, November 13, 2015, Durham, NC.

Member, International Scientific Committee, Pollutant Responses in Marine Organisms (PRIMO 18), Trondheim, Norway, May 24-27, 2015.

Keynote Speaker, Carolinas SETAC Annual Meeting, April 24-26, 2014, Clemson, SC. "A Case Study in Evolutionary Toxicology – the Elizabeth River Story."

Invited Speaker, Elizabeth River Project Sediment Remediation Partnership, August 1, 2013, Portsmouth, VA.

Session Chairman, Pollutant Responses in Marine Organisms (PRIMO 17), Faro, Portugal, May 5-8, 2013.

Invited Speaker, North Carolina One Health Collaborative, January 29, 2013, North Carolina Biotechnology Center, RTP, NC. "Ecological and Human Health Impacts of Mountaintop Mining."

Invited Speaker: Federal Workshop on the NAS Report: Exposure Science in the 21st Century – a Vision and a Strategy. December 3, 2012, EPA NHEERL, RTP, NC.

Organizer and Co-Host: Superfund Research Program 25th Annual Meeting. A Quarter Century of Transdisciplinary Research and Training to Protect Human and Environmental Health. October 21-24, 2012, Raleigh, NC

Symposium Organizer: "Causes and Consequences Connecting Environmental and Human Health." Sponsored by the Duke Superfund Research Center, the Integrated Toxicology and Environmental Health Program, the Nicholas School of the Environment and the School of Medicine, April 20, 2012, Durham, NC.

Panel Moderator, Nanomaterials, for TSCA Policy Workshop, March 28, 2012, Durham, NC.

Member, International Advisory Committee, 16th International Symposium on Pollutant Responses in Marine Organisms, May 15-19, 2011, Long Beach, CA.

Invited participant and panelist, Gulf Oil Spill SETAC Focused Topic Meeting, Pensacola, FL, April 26-28, 2011.

Symposium Organizer: "Mountaintop Coal Mining: Human Health and Ecological Concerns." Sponsored by the Foundation for the Carolinas and the Duke Integrated Toxicology and Environmental Health Program, April 9, 2010, Durham, NC.

Session Co-Chairman, Toxicity and Ecotoxicology, First International Conference on the Environmental Implications of Nanotechnology, September 9-11,2009, Washington, D.C.

Member, Organizing Committee, and Session Chairman, 21st Annual Superfund Basic Research Program Meeting, December 7-9, 2008, Pacific Grove, CA.

Session Co-Chairman, Mechanisms of PAH toxicity in Aquatic Animals, a session for the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 16-20, 2008, Tampa, FL.

Session Chairman, Human and Ecological Effects and Risks, Environmental Health Summit Meeting, “Pharmaceuticals in Water,” November 10-11 2008, Research Triangle Park, NC.

Invited Speaker, Franco-American Workshop on Environmental Nanotechnology, October 27-28, 2008, Washington, D.C.

Co-host and Organizer, Superfund Basic Research Program: 20 Years of Success and a Vision for the Future, 20th Annual Superfund Basic Research Program Meeting, December 3-5, 2007, Durham, NC.

Member, Organizational and Advisory Committee, 14th International Symposium on Pollutant Responses in Marine Organisms, May 6-9, 2007, Florianoplolis, Brazil.

Member, review team for College of Charleston Graduate Program in Marine Sciences, March - May, 2007.

Invited speaker and participant, “Fundulus Genomics Workshop”, sponsored by NSF, May 4-5, 2006, Charleston, SC.

Invited speaker and participant, “Cancer and the Environment”, sponsored by the Duke University Comprehensive Cancer Center and the Nicholas School, March 30-31, 2006, Durham, NC.

Invited speaker and participant, “Applications of Toxicogenomics to Cross-species Extrapolation” a workshop sponsored by the National Academy of Sciences, August 12-13, 2004, Washington, D.C.

Co-Chairman, “Emerging Molecular and Computational Approaches for Cross-Species Extrapolations” a SETAC/SOT sponsored workshop, July 18-22, 2004, Portland, OR.

Member, Organizational and Advisory Committee, 12th International Symposium on Pollutant Responses in Marine Organisms, May 8-13, 2003, St. Petersburg, FL.

Invited Participant, Symposium on Environmental Change and Human Health. Carolina Environmental Program, University of North Carolina at Chapel Hill. April 14-15, 2003, Chapel Hill, NC.

Organizer and participant, The Malaria – DDT Dilemma: Science, Policy, and Law. Duke University Integrated Toxicology Program, Superfund Basic Research Center, and Center for Environmental Solutions. November 7, 2002, Durham, NC.

Invited Participant and Moderator, Superfund Basic Research Program Meeting, Transitioning Basic Science into Practical Applications to Meet Environmental and Public Health Challenges, November 3-6, 2002, Tucson, Arizona.

Invited Participant, The Role of Environmental Agents in Cardiovascular Disease, sponsored by NIEHS, August 6-7, 2002, Durham, NC.

Member, Organizational and Advisory Committee, 11th International Symposium on Pollutant Responses in Marine Organisms, July 16-19, 2001, Plymouth, UK.

Invited participant, U.S. EPA Environmental Monitoring and Assessment Workshop, Gulf Breeze, FL, May 16-18, 2001

Member, Organizing Committee, "Oxidative Processes: Stress to Remediation." Sponsored by NIEHS, Duke University, and UNC – Chapel Hill, December 12-14, 2000, Chapel Hill, NC.

Invited participant, "Carolina Conference on Coastal Waters and Health." Sponsored by NIEHS, UNC, Wilmington, and IKA Works, USA, September 7-8, 2000, Wilmington, NC.

Chair, Steering Committee for “Environmental - Human Health Interconnections,” a SETAC/SOT sponsored workshop. June 10-15, 2000, Snowbird, Utah.

Invited participant, "Workshop to Evaluate Research Priorities for Endocrine Active Compound Risk Assessment Methods." Sponsored by U.S. EPA, NIEHS, and the Chemical Manufactures Association, August 31 and September 1, 1999, Research Triangle Park, NC.

Member, Organizational and Advisory Committee, 10th International Symposium on Pollutant Responses in Marine Organisms, April 25-29, 1999, Williamsburg, VA.

Invited Participant, “ICPS/OECD/EPA Scoping Meeting on Approaches to Integrated Risk Assessment,” a workshop sponsored by the United Nations, World Health Organization, and U.S. EPA, April 30 – May 2, 1998, Cary, NC.

Invited Participant, Bivalve Biomarkers Workshop, sponsored by NOAA, March 19–21, 1998, Charleston, SC.

Chair, Steering Committee for “Reproductive and Developmental Effects of Contaminants in Oviparous Vertebrates,” a SETAC sponsored Pellston Workshop, July 12-18, 1997, Butte, Montana.

Invited Participant, “Impacts of Pulp and Paper Mill Effluents on Fish Reproduction and Development,” Workshop sponsored by The National Council for Air & Stream Improvement, June 19-20, 1997, Chapel Hill, NC.

Invited Participant, “Endocrine Screening Methodology Workshop,” sponsored by U.S. EPA, World Wildlife Fund, and Chemical Manufacturers Association, July 15-16, 1996, Duke University, Durham, NC.

Invited Participant and Author, “Biotransformation in Environmental Risk Assessment,” a workshop sponsored by SETAC-Europe, Noordwijkerhout, The Netherlands, April 28 - May 1, 1996.

Chairman, “Endocrine Disrupters in the Environment,” Integrated Toxicology Program Symposium, Duke University, March 4, 1996, Durham, NC.

Session Co-Chairman, “Xenobiotics : Biotransformation, Metabolism and Consequences,” 8th International Symposium on Pollutant Responses in Marine Organisms, April 2-5, 1995, Pacific Grove, CA.

Invited Participant, First International Symposium on Ecosystem Health and Medicine, June 19-23, 1994, Ottawa, Ontario.

Session Chairman, "Interconnections Between Human and Ecosystem Health," `14th Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 14-18, 1993, Houston, TX.

Session Co-Chairman, "Oxidative Stress and HSP", 7th International Symposium on Responses of Marine Organisms to Pollutants, April 20-22, 1993, Göteborg, Sweden.

Session Co-Chairman, "Aquatic Toxicology," 12th Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 3-7, 1991, Seattle, WA.

Invited Participant and Author, NATO Advanced Research Workshop: "Strategy for Biomarker Research and Application in the Assessment of Environmental Health," Texel, The Netherlands, May 11-19, 1991.

Invited Participant, "Paper Industry Research Challenges," sponsored by the Technical Association of the Pulp and Paper Industries and the American Paper Industry, November 28-30, 1990, Charlotte, NC.

Invited Participant and Author, "The Population Ecology and Wildlife Toxicology of Agricultural Pesticide Use: A Modeling Initiative for Avian Species," a conference sponsored by the Society of Environmental Toxicology and Chemistry, Kiawah Island, SC, July 22-27, 1990.

Session Co-chairman, "Biomarkers," 14th ASTM Symposium on Aquatic Toxicology and Risk Assessment, April 22-24, 1990, San Francisco, CA.

Invited Participant, Sediment Genotoxicity Workshop, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS, March 6-8, 1990.

Invited Participant and Author, "Biomarkers" Workshop sponsored by the Society of Environmental Toxicology and Chemistry, Keystone, CO, July 23-28, 1989.

Invited Speaker, The Annual Biomedical Sciences Symposium -- Volatile Organic Compounds: Environmental and Human Health Significance. Wright State University, Dayton, Ohio, May 19, 1989. Title of Talk: "Oxyradical and Antioxidant Defenses: An Environmental Perspective."

Invited Participant and Author, "Ecological Assessments of Hazardous Waste Sites," Workshop sponsored by U.S. EPA, Corvallis, OR, May 3-4, and Seattle, WA, July 25-27, 1988.

Invited Lecturer, Wildlife Toxicology Workshop, December 14-16, 1987, Bellingham, Washington. Sponsored by U.S. Fish and Wildlife Service and the Institute of Wildlife Toxicology, Huxley College of Environmental Studies, Western Washington University, Bellingham.

Session Co-Chairman, "Biochemical Responses of Wildlife to Toxic Chemicals," 8th Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 9-12, 1987, Pensacola, FL.

Invited Participant, "Research Priorities in Environmental Risk Assessment," August 17-21, 1987, Breckenridge, CO. Sponsored by Society of Environmental Toxicology and Chemistry (SETAC). Workshop report published by SETAC.

Member, Planning Committee, Health Risk Reporting Conference, September 22, 1987, Chapel Hill, NC. Sponsored by Institute for Health Policy Analysis, Georgetown University.

Invited expert witness, U.S. EPA FIFRA Scientific Advisory Panel, for "Guidance Document for Conducting Terrestrial Field Studies," January 7-8, 1987, Arlington, VA.

Session Chairman, "Teratogenesis in Fish and Wildlife," 7th Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 2-5, 1986, Alexandria, VA.

Invited Participant, Avian Testing Issues Workshop, September 16-17, 1986, Washington, D.C. Sponsored by the National Agricultural Chemicals Association.

Chairman, Steering Committee, Session Co-Chairman, and Invited Speaker, Wildlife Toxicology Symposium. Sponsored by Society of Environmental Contamination and Toxicology, November 11-12, 1985, St. Louis, MO.

Invited Participant, Workshop on "Risk Assessment of Contaminants in Terrestrial Ecosystems," May 19-21, 1986, Corvallis, OR. Sponsored by U.S. EPA.

Invited Participant and Speaker, Workshop on "Toxics in North Carolina Waters," October 16, 1985, Raleigh, North Carolina. Sponsored by North Carolina Water Resources Research Institute and the Department of Natural Resources and Community Development.

Invited Participant and Speaker, Workshop on "Mercury in Florida Aquatic Systems," November 13, 1984, Atlanta, GA. Sponsored by U.S. EPA and State of Florida.

UNIVERSITY AND SCHOOL SERVICE:

Member, Environment and Population Health Planning Committee, Duke University, June 1, 2017 – present.

Interim Chair, Environmental Science and Policy Division, Nicholas School of the Environment, September, 2016 – present.

Member, Campus Conflict of Interest Committee, Duke University. September, 2010 – August, 2015.

Member, Faculty Recruitment and Review Committee for Dr. Jim Zhang, March, 2012 – May, 2013.

Chair, Faculty Review for Dr. Joel Meyer, August, 2012 – May, 2013.

Member, Faculty Review Committee for Dr. Heather Stapleton, August - December, 2011.

Member, Faculty Review Committee for Dr. Andrew Read, June - November, 2011.

Chair, Faculty Review Committee for Dr. Marie Lynn Miranda, October, 2010 – March, 2011.

Member, Search Committee, Director of the Office of Research Support, Duke University. May - December, 2010.

Member, Research Administration Continuous Improvement Committee, Duke University, January, 2008 – present.

Director, Integrated Toxicology and Environmental Health Program, Duke University, January, 2001 – present.

Director, Duke University Superfund Research Center, June, 2000 – present.

Director, Center for Comparative Biology of Vulnerable Populations, April, 2005 – March, 2010.

Member, Academic Council, Duke University, April 1989 - April 1991, April 1993 – 1999, April 2001 – April 2006, April 2008 – April 2009, and April 2010 – April, 2012.

Member, Duke University Committee for Appointment, Promotion and Tenure, September, 2006 – 2009.

Chair, Search Committee, Global Environmental Health, March 2008 – May, 2009.

Chair, Faculty Review Committee for Dr. Heather Stapleton, January - April, 2008.

Chair, Provost’s Working Group, The Environment and Health Sciences, September, 2005 – December, 2007.

Member, Nicholas School Dean Search Committee, December, 2006 – May, 2007.

Member, Nicholas Hall Building Committee, June 2004 – June, 2007.

Chair, Environmental Molecular Toxicology Search Committee, October, 2005 – April, 2006.

Chair, Environmental Chemistry Search Committee, November, 2004 – May, 2005.

Chair, Minority Faculty Recruitment Initiative, Division of Environmental Science and Policy, Nicholas School of the Environment and Earth Sciences (NSEES), May, 2003 – October, 2004.

Chair, Faculty Review Committee for S. Kullman, November, 2003 – April, 2004.

Member, Faculty Review Committee for M.L. Miranda, February – May, 2004.

Member, Provost’s Review Committee for Vice Provost for Research (J. Siedow), March – April, 2004.

Member, Space Committee, Division of Environmental Science and Policy, NSEES, September, 2002 – present.

Chair, Tenure Review Committee for J. Freedman, NSEES, May, 2000 – March, 2001.

Member, Search Committee, Dean, Nicholas School of the Environment and Earth Sciences, May, 2000 – March, 2001.

Chair, Review Committee for S. Kullman, Nicholas School of the Environment and Earth Sciences, May, 2001.

Core Leader, Biochemistry, Marine and Freshwater Biomedical Center, Duke University Marine Laboratory, January, 1995 – May, 2001.

Member, Research Policy Committee, Duke University, September, 1989 - August, 1993, and September, 1995 – May, 2000.

Chair, Search Committee, Environmental Toxicologist (endowed chair), Nicholas School of the Environment, December 1996 – May, 2000.

Chair, Environmental Toxicology, Chemistry, and Risk Assessment Program (Master of Environmental Management), Nicholas School of the Environment, April, 1990 – August, 1999.

Member, Faculty Council, Nicholas School of the Environment, January, 1998 – May, 1999.

Member, Radiation Safety Committee, Duke University, September, 1991 – May, 1999.

Member, Self Study Steering Committee, Duke University, for the Southern Association of Colleges and Schools, February, 1996 – May, 1998.

Member, Search Committee, Environmental Chemist (tenure-track), Nicholas School of the Environment, November, 1996 – April, 1997.

Member, Provost’s Task Force on Geology and Environmental Science at Duke University, September, 1995 - January, 1996.

Member, Search Committee, Water Quality Scientist (non-tenure track), School of the Environment, February, 1996 - May, 1996.

Member, Search Committee, Microbial Ecologist (tenure track), School of the Environment, November, 1994 - May, 1995.

Member, Curriculum Committee, Biohazards Program, Division of Occupational and Environmental Medicine, Duke University, September, 1992 - August, 1995.

Chair, Search Committee, Environmental Toxicologist (tenure track), School of the Environment, September, 1993 - May 1994.

Theme Leader, Environmental Toxicology and Chemistry, Marine Biomedical Center, Duke University Marine Laboratory, July, 1991 - January, 1995.

Member, Science Resources Initiative Planning Committee, Duke University, 1990 - 1991.

Member, Conflict of Interest Committee, Duke University, March, 1990 - May, 1991.

Member, Advisory Committee, Duke University Marine Laboratory, March, 1987 - June, 1990.

Member, Duke University Integrated Toxicology Program Review Committee, April - December, 1989.

Member, Admissions Committee, Duke University Integrated Toxicology Program, January, 1983 - August, 1986.

Previously served on following committees for the School of the Environment (Forestry and Environmental Studies), Duke University: Admission and Awards (1983-1992; chair, 1985), Faculty Council (1990-92), Commencement (chair, 1990), Environmental Chemist Search Committee (1987), Water Resources Scientist Search Committee (1988), Space Committee (1992-1994), Alumni Council (1994-96), Commencement, 1999-2002.

Howard Hughes Research Mentor, Duke University, June - August, 1990 – 2011.

Mentor for: (1) Duke Fellows Program (for area high school teachers), 1991-1996. (2) North Carolina School of Science and Mathematics University Program, September 1993 - May, 1996.

CONSULTING:

Consultant for Federal Public Defender, Nashville, TN concerning a death row appeal, December, 2014 – present.

Consultant for Wallace and Graham, P.A. Salisbury, NC, for assessment of occupational exposures, September, 2009 – present.

Consultant for Plaintiff’s Steering Committee, New Orleans, LA, for ecological effects of the Deepwater Horizon oil spill, July, 2011- December, 2013.

Consultant for the American Chemistry Council, Washington, D.C., concerning ecotoxicogenomics of bisphenol A, July, 2011 – May, 2013.

Consultant for NOAA and Stratus Consulting for design of studies to determine ecological impacts of the BP Deep Horizon oil spill in the Gulf of Mexico, August, 2010 – January, 2011.

Reviewer for Gulf Medical College, Amjen, United Arab Emirates, for proposed Graduate Program In Toxicology, April – May, 2008.

Reviewer for Eastern Research Group of “Validation of the Fish Short-Term Reproduction Assay: Integrated Summary Report,” U.S. EPA,
Endocrine Disruptor Screening Program, January, 2008.

Consultant for analysis of environmental impacts of Hurricane Katrina, for IEM, under contract to FEMA, Washington, DC, December, 2005 – May, 2006.

Consultant, for analysis of ecological impacts of creosote in estuarine systems, for NOAA, under contract to Stratus Consulting, Inc., Boulder, CO, February - June, 2005.

Consultant, for preparation of Carcinogenesis Background Documents for the National Toxicology Program, NIEHS, under contract to Technology Planning and Management Corporation, Durham, NC, August, 2001- May, 2003.

Consultant, Peer Review Process for the Fox River Human and Ecological Risk Assessment, sponsored by the Association for the Environmental Health of Soils, Amherst, MA, December, 1999 – May, 2001.

Member, External Review Committee, School of Environmental Studies, Queen's University, Kingston, Ontario, November, 1999.

Invited speaker, “Emerging Issues in Environmental Pollution,” Battelle, Chicago, IL, January 19, 1999.

Chair, Committee to review proposed Ph.D. program in environmental science at Arkansas State University, Jonesboro, September, 1997.

Consultant to Search Committee for Chair, Department of Environmental Toxicolgy, Clemson University, September, 1997.

Scientific advisor on water quality issues for Lake Steilacoom Improvement Club, Tacoma, WA, August, 1996 – June, 1997.

Scientific advisor on mercury in south Florida wetlands for Hopping, Boyd, Green and Sams, February, 1994 – May, 1995.

Scientific advisor on aquatic toxicology for Research and Evaluation Associates, January, 1993 - December, 1995.

Mentor, National Human Exposure Assessment (NHEXAS) Program, sponsored by U.S. EPA, administered by the Cadmus Group, 1991 -1993.

Scientific advisor for ecological risk assessments of Superfund sites for Hydrosystems, Inc. January, 1990 - December 1992.

Scientific advisor for ecological hazards associated with contaminated sediments in the Hudson River, NY, for Gradient, Inc., February, 1991 - June, 1992.

Scientific advisor for environmental hazards associated with bleached kraft mill effluents, Georgia-Pacific Corp., August 1991 - February, 1992.

Scientific advisor assisting with research needs and hazard assessments relevant to pesticide registration for Jellineck, Schwartz, Connolly and Freshman, Inc., Washington, D.C., May, 1988 - December, 1991.

Scientific advisor assisting with research needs and hazard assessments relevant to pesticide registration for Rhone-Poulenc, Inc., July, 1990 - June, 1991.

Scientific advisor and author, "Biochemical/protein responses", a portion of the U.S. EPA EMAP (Ecological Monitoring and Assessment Program) Technical Report. August - September, 1989.

Scientific advisor assisting with design of state-of-the-art protocols for wildlife hazard assessment of pesticides for American Cyanamid Corporation. December, 1985 - February, 1991.

Scientific advisor for evaluating hazards to wildlife from pesticides for FMC Corporation. August, 1986 - August, 1991.

Scientific advisor assisting with research needs relevant to pesticide registration for CIBA-GEIGY Corporation. January, 1986 - December, 1989.

Subcontractor for Kilkelly Environmental Associates for EPA-requested task entitled "Data collection to support ecological risk assessments." August - October, 1987.

Subcontractor for Research Triangle Institute for EPA-requested task entitled "Technical assistance in the development of the Monte Carlo uncertainty analysis for the surface water component for land disposal restrictions determinations." October, 1985 - April, 1986 (with K.H. Reckhow and C. M. Marin).

Scientific witness for Carolina Co-Generation Company. Topic: Mercury in North Carolina peatlands and their drainage waters. December, 1984.

TEACHING – ENV courses: (Enrollment)

360	**501**	**215**	**319**	**537**	**299**	**313**	**318**	
	30					6		1982-83
	18	17			2	15		1983-84
	29				3	13		1984-85
	29	39			6			1985-86
	22				3			1986-87
	21	23			2			1987-88
	12				2	12		1988-89
		42			1			1989-90
	25					15	22	1990-91
	16	38					24	1991-92
				Sabbatical leave				1992-93
	43	40						1993-94
	31		11		1		23	1995-96
	33					12	22	1996-97
	33		8				23	1997-98
	33					9	15	1998-99
	Sabbatical		6		2			1999-00
	17				1			2000-01
6	7				2		26	2001-02
10	11				2			2002-03
11	8						18	2003-04
9	16							2004-05
9	13							2005-06
7	11							2006-07
11	17						24	2007-08
11	15							2008-09
9	Sabbatical							2009-10
12	14			13				2010-11

18	19	20	2011-12
12	19	15	2012-13
16	14	30	2013-14
11	26	30	2014-15
18	18	27	2015-16
10	11		2016-17

Course Titles for Above Courses:

ENV 360: Environmental Chemistry and Toxicology (formerly ENV 160)

ENV 501: Environmental Toxicology (formerly ENV 212)

ENV 215: Environmental Physiology

ENV 537: Environmental Health (formerly ENV 298.50)

ENV 319: Mechanisms in Environmental Toxicology

ENV 299: Independent Projects

ENV 313: Advanced Topics in Environmental Toxicology

ENV 318: Ecological Risk Assessment: Theory and Practice

ADVISING: (completed degrees supervised)

Master of Environmental Management: 72

Master of Science theses: 9

Ph.D. dissertations:

Habig, Clifford. 1987. Comparative toxicity of the cotton defoliant S,S,S, tri-n-butyl phosphorotrithioate (DEF) to channel catfish and blue crabs.

Mihaich, Ellen Mather. 1989. Biochemical responses in channel catfish exposed to bleached kraft pulp and paper mill effluent.

Gallagher, Evan P. 1991. Glutathione-dependent metabolism and utilization in the channel catfish (*Ictalurus punctatus*).

Watson, David E. 1995. Bioactivation and genotoxicitiy of 2-aminoanthracene in two Ictalurid species.

Ploch, Stephen A. 1997. Comparative activation and genotoxicity of benzo[a]pyrene in two species of Ictalurid catfish.

Monteverdi, George H. 1999. Vitellogenin-mediated chemical uptake by oocytes of the estuarine killifish (*Fundulus heteroclitus*).

Kelly, Sue A. 2000. Developmental toxicology of estrogenic alkylphenols in an estuarine killifish.

Meyer, Joel N. 2003. Mechanisms of adaptation and fitness costs associated with adaptation to a chemically-contaminated environment.

Rau, Michelle A. 2004. Expression and function of the tumor suppressor gene p53 in fish models.

Wassenberg, Deena M. 2004. Interactive effects of polycylic aromatic hydrocarbons on cytochrome P4501A activity and embryonic development in the killifish, *Fundulus heteroclitus*.

Augspurger, T.P. 2006. The wood duck (*Aix sponsa*) as a sentinel of exposure to and effects of polychlorinated dibenzo-*p*-dioxins and dibenzofurans at contaminated sites,

Timme-Laragy, Alicia R.V. 2007. Mechanisms underlying synergistic developmental toxicity of polycyclic aromatic hydrocarbons in zebrafish.

Battle, Lauren P. 2008. Polycyclic aromatic hydrocarbon metabolism in two populations of *Fundulus heteroclitus* with different exposure histories.

Jung, Dawoon. 2009. Mitochondria as a target of benzo[a]pyrene toxicity in a PAH-adapted population of the Atlantic killifish (*Fundulus heteroclitus*).

Clark, Bryan. 2010. Molecular mechanisms underlying adaptation to PAHs in *Fundulus heteroclitus*.

Fleming, Carrie. 2010. Interactions between environmental factors and polycyclic aromatic hydrocarbons (PAHs) in developing fish: molecular and developmental implications.

Van Tiem, Lindsey A. 2011. Molecular mechanisms of polycyclic aromatic hydrocarbon-induced teratogenesis in zebrafish (*Danio rerio*).

Arnold, Mariah C. 2014. Impacts of mountaintop removal coal mining on the Mud River, West Virginia: selenium accumulation, trophic transfer, and toxicity in fish.

Bone, A.J. 2015. Incorporating environmental realism into the toxicity of nanoparticles to early life stage fish.

Brown, D.R. 2015. Later life consequences of subteratogenic exposure to a complex PAH mixture in the Atlantic killifish (*Fundulus heteroclitus*).

RESEARCH INTERESTS:

My research is focused upon molecular and organismal responses of aquatic animals to environmental stressors, particularly contaminants. The laboratory is concerned with both basic studies of mechanisms of contaminant metabolism,

adaptation and toxicity, and with the development of sensitive, mechanistically-based indices of exposure and toxicity that can be used in biomonitoring of free-living organisms. Additionally, through collaborations, I seek innovative approaches for elucidating linkages between human and ecological health.

Current research activities are focused on the following three subjects: 1. The effects of polycyclic aromatic hydrocarbons (PAHs) on embryonic development, later life consequences, and adaptations in fish models, including mechanistic laboratory studies and field studies. 2. The effects of nanomaterials on vertebrate development, including interactions with other environmental variables such as UV radiation, organic matter, temperature and other contaminants. 3. The impacts of fossil fuel extraction, use and waste disposal on human and ecological health.

REFEREED PUBLICATIONS:

Bone, A.J., C.R. Fleming, E. Cooper, L.V.T. Garner, H.M. Stapleton, and R.T. Di Giulio. Photodegraded carbazole is embryotoxic to zebrafish (*Danio rerio*) in an AhR-dependent manner. Environmental Toxicology and Chemistry (in review).

Da Rocha, M., J. Zanette, J.M. Monserrat, N. Jyasundara, and R. Di Giulio. Antioxidant and housekeeping gene responses in zebrafish (*Danio rerio*) embryos exposed to single-walled carbon nanotubes. Ecotoxicology and Environmental Safety (in review).

Di Giulio, R.T., and M.C. Newman. Ecotoxicology. In: Klaassen, C.D., ed. Casarett and Doull's Toxicology. The Basic Science of Poisons, Ninth Edition. McGraw Hill, New York (in review).

Jayasundara, N., P.W. Fernando, J.S. Osterberg, K.M. Cammen, T.F. Schultz, and R.T. Di Giulio. Cost of tolerance: physiological consequences of evolved resistance to inhabit a polluted environment in teleost fish. Environmental Science and Technology (in review).

Massarsky. A., G.L. Prasad, and R.T. Di Giulio. Total particulate matter from cigarette smoke disrupts angiogenesis in developing zebrafish (*Danio rerio*). Environmental Health Perspectives (in review).

Mu, J., M. Chernick, W. Dong, R.T. Richard T Di Giulio, and D.E. Hinton. Early life co-exposures to a real-world PAH mixture and hypoxia result in later life and next generation consequences in medaka (*Oryzias latipes*). Aquatic Toxicology (in review).

Arnold, M.C., R.L. Bier, T.T. Lindberg, E. Bernhardt, and R.T. Di Giulio. Biofilm mediated uptake of selenium in streams with mountaintop mine drainage. Limnologica (accepted).

Brown, D.R., J. Thompson, M. Chernick, D.E. Hinton, and R.T. Di Giulio. Later life swimming performance and persistent heart damage following subteratogenic PAH mixture exposure in the Atlantic killifish (*Fundulus heteroclitus*). Environmental Toxicology and Chemistry (accepted).

Massrasky, A., A. Abdel, L. Glazer, E.D. Levin, and R.T. Di Giulio. Exposure to 1,2-propanediol impacts early development of zebrafish (*Danio rerio*) and induces hyperactivity. Zebrafish (in press).

Yang, YI, B. Chen[3], J. Hower, M. Schindler, C. Winkler, J. Brandt, R. Di Giulio, M. Liu, Y. Fu, L. Zhang, S. Priya, and M. F. Hochella Jr. Discovery and ramifications of incidental Magnéli phase generation and release from

industrial coal burning. Nature Communications (in press).

Brandt, J., E. Bernhardt, G. Dwyer, and R. Di Giulio. 2017. Selenium ecotoxicology in freshwater lakes receiving coal combustion residual effluents: A North Carolina example. Environmental Science and Technology 51:2418-2426.

Burton, G.A., R. Di Giulio, R. Costello and J. Rohr. 2017. Slipping through the cracks: Why is the U.S. Environmental Protection Agency not funding extramural research on chemicals in our environment? Environmental Science and Technology 51:755-756.

Lindberg, C.D., N. Jayasundara, J.S. Kozal, T.C. Leuthner, and R.T. Di Giulio. 2017. Evolved resistance to polycyclic aromatic hydrocarbon toxicity and associated bioenergetic consequences in a population of *Fundulus heteroclitus*. Ecotoxicology DOI 10.1007/s10646-017-1775-6.

Massarsky, A., J.S. Kozal, and R. T. Di Giulio. 2017. Glutathione and zebrafish: old assays to address a current issue. Chemosphere 168:707-715.

Mouneyrac, C., J.M. Unrine, L. Giamberini, O.V. Tsyusko, C. Santaella, R.T. Di Giulio, and F. Schwab. 2017. Ecotoxicology principles for manufactured nanomaterials. In: M. Wiesner and J.-Y. Bottero, eds. Environmental Nanotechnology, 2nd Edition, McGraw-Hill, New York, 395 pp.

Raftery, T.D., N. Jayasundara, and R.T. Di Giulio. 2017. A bioenergetics assay for studying the effects of environmental stressors on mitochondrial function *in vivo* in zebrafish larvae. Comparative Biochemistry and Physiology, Part C: Toxicology and Pharmacology 192:23-32

Slotkin, R.A., S. Skavicus, J. Card, R.T. Di Giulio, and F. J. Seidler. 2017. In vitro models reveal differences in the developmental neurotoxicity of an environmental polycylic aromatic hydrocarbon mixture compared to benzo[a]pyrene: neuronotypic PC12 cells and embryonic neural stem cells. Toxicology 377:49–56.

Vengosh, A., T.T. Lindberg, B.R. Merola, L. Ruhl, A. White, G.S. Dwyer, and R.T. Di Giulio. 2017. Isotopic imprints of mountaintop mining contaminants. Environmental Science and Technology 47:10041-10048.

Brown, D.R., B.W. Clark, L.V.T. Garner, and R.T. Di Giulio. 2016. Embryonic cardiotoxicity of weak aryl hydrocarbon receptor agonists and CYP1A inhibitor fluoranthene in the Atlantic killifish (*Fundulus heteroclitus*) Comparative Biochemistry and Physiology, Part D, 188:45-51.

Dasgupta, S., R.T. Di Giulio, B. Drollette, D. Plata, B.J. Brownawell, and A.E. McElroy. 2016. Hypoxia depresses CYP1A induction and enhances DNA damage, but has minimal effects on antioxidant responses in sheepshead minnow (*Cyprinodon variegatus*) larvae exposed to dispersed crude oil. Aquatic Toxicology 177:250-260.

Matson, C., A. Bone, M. Auffan, T. Lindberg, M. Arnold, H. Hsu-Kim, M. Wiesner, and R. Di Giulio. 2016. The role of dissolved silver chloride species (AgClx) in Atlantic killifish (*Fundulus heteroclitus*) and medaka (*Oryzias latipes*) early life-stage toxicity. Ecotoxicology 25:115-1118. DOI 10.1007/s10646-016-1665-3.

Massarsky, A., A. Bone, G. Prasad, and R. Di Giulio. 2016. AHR2 morpholino knockdown reduces the toxicity of total particulate matter to zebrafish embryos. Toxicology and Applied Pharmacology 309:63-76.

Riley, A.K., M. Chernick, D.R. Brown, R. Cameron, D.E. Hinton, and R.T. Di Giulio. 2016. Hepatic responses of juvenile *Fundulus heteroclitus* from

pollution-adapted and non-adapted populations exposed to Elizabeth River sediment extract. Toxicologic Pathology 44:738-748. (DOI: 10.1177/0192623316636717; PMID: 26992886.

Arnold, M.C., J. Forte, J.S. Osterberg, and R.T. Di Giulio. 2016. Antioxidant rescue of selenomethionine-induced teratogenesis in zebrafish embryos. Archives of Environmental Contamination and Toxicology 70:311–320

Brown D.R., J. Bailey, A. Oliveri, E.D. Levin, and R.T. Di Giulio. 2016. Developmental exposure to a complex PAH mixture causes persistent behavioral effects in naive *Fundulus heteroclitus* (killifish) but not in a population of PAH-adapted killifish. Neurotoxicology and Teratology 53:55-63. PMCID: PMC4803068

Arnold, M., L. Friedrich, T. Lindberg, M. Ross, Matthew, N. Halden, E. Bernhardt, V. Palace, and R. Di Giulio. 2015. Microchemical analysis of selenium in otoliths of two West Virginia fishes captured near mountaintop coal removal mining operations. Environmental Toxicology and Chemistry 34:1039-1044.

Bone, A, C. Matson, B. Coleman, X. Yang, J. Meyer, and R. Di Giulio. 2015. Silver nanoparticle toxicity to early life stage Atlantic killifish (*Fundulus heteroclitus*) and *Caenorhabditis elegans* in complex environmental media: A comparison of laboratory, mesocosm and microcosm studies. Environmental Toxicology and Chemistry 34:275-282.

Brown, D.R., B.W. Clark, L.V.T. Garner, and R.T. Di Giulio. 2015. Zebrafish cardiotoxicity: the effects of CYP1A inhibition and AHR2 knockdown following exposure to weak aryl hydrocarbon receptor agonists. Environmental Science and Pollution Research 22:8329-8338. DOI 10.1007/s11356-014-3969-2).

Carvan, M.J., and R.T. Di Giulio. 2015. Oxidative stress responses in aquatic and marine fishes. Pp. 481-493 in Roberts, S.M., J. Kehrer and O. Klotz, eds. Oxidative Stress in Applied Basic Research and Clinical Practice. Studies on Experimental Toxicology and Pharmacology (D. Armstrong, editor-in-chief) Springer, New York.

Di Giulio, R.T., and B.W. Clark. 2015. The Elizabeth River story: a case study in evolutionary toxicology. Journal of Toxicology and Environmental Health, Part B – Critical Reviews 18:259-298.

Gorka, D.E., J.S. Osterberg, C.A. Gwin, B.P. Colman, J.N. Meyer, E.S. Bernhardt, C.K. Gunsch, R.T. Di Giulio, and J. Liu. 2015. Reducing environmental toxicity of silver nanoparticles through shape control. Environmental Science and Technology 49:10093-10098.

Jayasundara, N., J.S. Kozal, M. C. Arnold, S.S.L. Chan, and R.T. Di Giulio. 2015. High-throughput tissue bioenergetics analysis reveals identical metabolic allometric scaling for teleost hearts and whole organisms. PLoS ONE 10(9): e0137710. doi:10.1371/journal.pone.0137710.

Jayasundara, N., L. Van Tiem, J. N. Meyer, K. Erwin, and R.T. Di Giulio. 2015. AHR2 mediated transcriptomic responses underlying the synergistic cardiac developmental toxicity of PAHs. Toxicological Sciences 143:469-481.

Massarsky, A, N. Jayasundara, J.M. Bailey, E.D. Levin, G.L. Prasad, and R.T. Di Giulio. 2015. Teratogenic, bioenergetic, and behavioral effects of exposure to total particulate matter on early development of zebrafish (Danio rerio) are not mimicked by nicotine. Neurotoxicology and Teratology 51:77-88.

Arnold, M.C., T.T. Lindberg, Y.-T. Liu, K.A. Porter, H. Hsu-Kim, D.E. Hinton, and R.T. Di Giulio. 2014. Bioaccumulation and speciation of selenium in

fish and insects collected from a mountaintop removal coal mining-impacted stream in West Virginia. Ecotoxicology 23:929-938.

Auffan, M., C.W. Matson, J.C. Rose, M. Arnold, O. Proux, B. Fayard, P. Chaurand, M.R. Wiesner, J.-Y. Bottero, and R.T. Di Giulio. 2014. Salinity-dependent silver nanoparticle uptake and biotransformation in Atlantic killifish (*Fundulus heteroclitus*)embryos. Nanotoxicology 8:167-176.

Blickley, T.M., C. Matson, W.N. Vreeland, D. Rittschoff, R. Di Giulio, and P.D. McClellan-Green. 2014. Effects of dietary CdSe/ZnS quantum dot exposure in estuarine fish: bioavailability, oxidative stress responses, reproduction, and maternal transfer. Aquatic Toxicology 148:27-49.

Fang, M., G.J. Getzinger, E.M. Cooper, B.W. Clark, L.V.T. Garner, R.T. Di Giulio, P.L. Ferguson, and H.M. Stapleton. 2014. Effect-directed analysis (EDA) of Elizabeth River pore water: developmental toxicity in zebrafish (*Danio rerio*). Environmental Toxicology and Chemistry 33:2767-2774.

Arnold, M.C., A.R. Badireddy, M.R. Wiesner, R.T. Di Giulio, and J.N. Meyer. 2013. Cerium oxide nanoparticles are more toxic than equimolar bulk cerium oxide in *Caenorhabditis elegans*. Archives of Environmental Toxicology and Contamination 65:224-233.

Bozinovic, G., T.L. Sit, R.T Di Giulio, L.P. Wills, and M.F. Oleksiak. 2013. Genomic and physiological responses to strong selective pressure during late organogenesis: few gene expression changes found despite striking morphological differences. BMC Genomics 14:779; DOI: 10.1186/10.1186/1471-2164-14-779. PMCID: 3835409.

Clark, B.W., A.J. Bone, and R.T. Di Giulio. 2013. Resistance to aryl-hydrocarbon-induced cardiac teratogenesis in F1 and F2 embryos of PAH-adapted *Fundulus heteroclitus* is strongly inherited despite reduced recalcitrance to induction of the AHR pathway. Environmental Science and Pollution Research 21:13898-908. PMCID: 24374617.

Clark, B.W., E.M. Cooper, H.M. Stapleton, and R.T. Di Giulio. 2013. Compound- and mixture-specific differences in resistance to PAHs and PCB-126 among *Fundulus heteroclitus* subpopulations throughout the Elizabeth River estuary (Virginia, USA). Environmental Science and Technology 47:10556-10566(DOI: 10.1021/es401604b). PMCID pending.

Di Giulio, R.T. and M.C. Newman. Ecotoxicology. 2013. Pp. 1275-1303 in Klaassen, C.D., ed. Casarett and Doull's Toxicology. The Basic Science of Poisons, 8th edition. McGraw-Hill, New York, 1454 pp.

Garner, L.V.T., D.R. Brown, and R.T. Di Giulio. 2013. The role of zebrafish (*Danio rerio*) AHR1 isoforms in PAH- and PCB-126-induced toxicity. Aquatic Toxicology 142/143:336-346. PMCID: 3837554.

Levard, C., E.M. Hotze, B.P. Colman, L. Truong, X. Yang, A. Bone, G.E. Brown, Jr., R.L. Tanguay, R.T. Di Giulio, E.S. Bernhardt, J.N. Meyer, M.R. Wiesner, and G.V. Lowry. 2013. Sulfidation and chlorination of silver nanoparticles: natural antidote to their ecotoxicity. Environmental Science and Technology: 47:13440-13448. doi.org/10.1021/es403527n.

Turner, E.A., G.L. Kroeger, M.H. Arnold, B.L.M. Thornton, R.T. Di Giulio, and J.N. Meyer. 2013. Assessing different mechanisms of toxicity in mountaintop removal/valley fill coal mining-affected watershed samples using *Caenorhabditis elegans*. PLoS One 8(9): e75329.

Vengosh, A., T. T. Lindberg, B.R. Merola, L. Ruhl, N. R. Warner, A. White, G. S. Dwyer, and R. T. Di Giulio. 2013. Isotopic imprints of mountaintop mining

contaminants. Environmental Science and Technology 47:10041-10048. DOI:10.1021/es4012959.

Zhao, B., J.E.S. Bohonowych, A. Timme-Laragy, D. Jung, A.A. Affatato R.H. Rice, R.T. Di Giulio, and M.S. Denison. 2013. Common commercial and consumer products contain activators of the aryl hydrocarbon (dioxin) receptor. PLoS ONE 8(2): e56860. doi:10.1371/journal.pone.0056860. PMCID pending.

Bone, A.J., B.P. Colman, A.P. Gondikas, K.M. Newton, K.H. Harrold, R.M. Cory, J.M. Unrine, S.J. Klaine, C.W. Matson, and R.T. Di Giulio, R.T. 2012. Biotic and abiotic interactions in aquatic microcosms determine fate and toxicity of Ag nanoparticles: Part 2 – Toxicity and Ag speciation. Environmental Science and Technology 46:6925-6933.

Garner, L.V.T., R.T. Di Giulio. 2012. Glutathione s-transferase pi class 2 (GSTp2) protects against the cardiac deformities caused by exposure to PAHs but not PCB-126 in zebrafish embryos. Comparative Biochemistry and Physiology 155D:573-579.

Clark, B.W., and R.T. Di Giulio. 2012. *Fundulus heteroclitus* adapted to PAHs are cross-resistant to multiple insecticides. Ecotoxicology 21:465-474.

Lindberg, T.T., Bernhardt, E.S., Bier, R., Helton, A., Merola, B., Vengosh, A., and Di Giulio, R.T. 2011. Cumulative impacts of mountaintop mining on an Appalachian watershed. Proceedings of the National Academy of Science 108:20929-20934.

Fleming, C.R., and R.T. Di Giulio. 2011. The role of CYP1A inhibition in the embryotoxic interactions between hypoxia and polycyclic aromatic hydrocarbons (PAHs) and PAH mixtures in zebrafish (*Danio rerio*). Ecotoxicology 20:1300-1314 (DOI 10.1007/s10646-011-0686-1).

Jung, D., C.W. Matson, L.B. Collins, G. Laban, H.M. Stapleton, J.W. Bickham, J.A. Swenberg, and R. T. Di Giulio. 2011. Genotoxicity in Atlantic killifish (*Fundulus heteroclitus*) from a PAH-contaminated Superfund site on the Elizabeth River, Virginia. Ecotoxicology 20:1890-1899(DOI 10.1007/s10646-011-0727-9).

Van Tiem, L.A. and R.T. Di Giulio. 2011. AHR2 knockdown prevents PAH-mediated cardiac toxicity and XRE- and ARE-associated gene induction in zebrafish (*Danio rerio*). Toxicology and Applied Pharmacology 254:280-287; doi:10.1016/j.taap.2011.05.002.

Wiesner, M.R., G.V. Lowry, E. Casman, P.M. Bertsch, C.W. Matson, R.T. Di Giulio, J. Liu, and M.F. Hotchella, Jr. 2011. Meditations on the ubiquity and mutability of nano-sized materials in the environment. ACS Nano Perspectives 5:8466-8470.

Clark, B.W., C.W. Matson, D. Jung, and R.T. Di Giulio. 2010. AHR2 mediates cardiac teratogenesis of polycyclic aromatic hydrocarbons and PCB-126 in Atlantic killifish (*Fundulus heteroclitus*). Aquatic Toxicology 99:232-240.

Cooper, E.M., H.M. Stapleton, C.W. Matson, R.T. Di Giulio, and A.J. Schuler. 2010. UV treatment and biodegradation of dibenzothiophene: identification and toxicity of products. Environmental Toxicology and Chemistry 29:2409-2416.

Hunter, S.E., D.Jung, R.T. Di Giulio, and J.N. Meyer. 2010. The QPCR assay for analysis of mitochondrial DNA damage, repair, and relative copy number. Methods 51:444-451.

Il'yasova, D., I. Spasojevich, F. Wang, A. A. Tolun, K. Base, S.P. Young, P.K. Marcom, J. Marks, G. Mixon, R. Di Giulio, and D.S. Millington. 2010. Urinary biomarkers of oxidative status in a clinical model of oxidative assault. Cancer Epidemiology Biomarkers and Prevention 19:1506-1510.

Jung, D., and R.T. Di Giulio. 2010. Identification of mitochondrial cytochrome P450 induced in response to polycyclic aromatic hydrocarbons in the Atlantic killifish (*Fundulus heteroclitus*). Comparative Biochemistry and Physiology (Part C)151:107-112.

Wills, L.P., D. Jung, K. Koerhn, S. Zhu, K.L. Willett, D.E. Hinton, and R.T. Di Giulio. 2010. Comparative chronic liver toxicity of benzo[*a*]pyrene in two populations of the Atlantic killifish (*Fundulus heteroclitus*) with different exposure histories. Environmental Health Perspectives 118:1376-1381.

Wills, L.P., C.W. Matson, C.D. Landon, and R.T. Di Giulio. 2010. Characterization of the recalcitrant CYP1 phenotype found in Atlantic killifish (*Fundulus heteroclitus*) inhabiting a Superfund site on the Elizabeth River, VA. Aquatic Toxicology 99:33-41.

Fleming, C.R., S.M. Billiard, and R.T. Di Giulio. 2009. Hypoxia inhibits induction of aryl hydrocarbon receptor activity in topminnow hepatocarcinoma cells in an ARNT-dependent manner. Comparative Biochemistry and Physiology (Part C)150:383-389.

Il'yasova, D., G. Mixon, F. Wang, P.K. Marcom, J. Marks, I. Spasojevich, N. Craft, F. Arredondo, and R. Di Giulio. 2009. Epidemiological markers of oxidative status: pilot validation study. Biomarkers 14:321-325.

Jung, D., Y. Cho, Y., L. B. Collins, J.A. Swenberg, and R.T. Di Giulio. 2009. Effects of benzo[*a*]pyrene on mitochondrial and nuclear DNA damage in Atlantic killifish (*Fundulus heteroclitus*) from a creosote-contaminated and reference site. Aquatic Toxicology 95:44-51.

Jung, D., Y. Cho, J.N. Meyer, and R.T. Di Giulio. 2009. The long amplicon quantitative PCR for DNA damage assay as a sensitive method of assessing DNA damage in the environmental model, Atlantic killifish (*Fundulus heteroclitus*). Comparative Biochemistry and Physiology (Part C)149:182-186.

Timme-Laragy, A.R., L.A. Van Tiem, and R.T. Di Giulio. 2009. Antioxidant responses and NRF2 in synergistic developmental toxicity of PAHs in zebrafish. Toxicological Sciences 109:217-227.

Wiesner, M.R., G.V. Lowry, K.L. Jones, M.F. Hochella, Jr., R.T. Di Giulio, E. Casman, and E.S. Bernhardt. 2009. Decreasing uncertainties in assessing environmental exposure, risk and ecological implications of nanomaterials. Environmental Science and Technology 43:6458-6462.

Wills, L.P., S. Zhu, K.L. Willett, and R.T. Di Giulio. 2009. Effect of the CYP1A inhibitor fluoranthene on the biotransformation of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. Aquatic Toxicology 92:195-201.

Augspurger, T.P. K.R. Echols, P.H. Peterman, T.W. May, C.E. Orazio, D.E. Tillitt, and R.T. Di Giulio. 2008. Accumulation of environmental contaminants in wood duck (*Aix sponsa*) eggs with emphasis on 2,3,7,8-tetrachlordibenzo-p-dioxin equivalents. Archives of Environmental Contamination and Toxicology 55:670-682.

Augspurger, T.P., D.E. Tillitt, S.J. Bursian, S.D. Fitzgerald, D.E. Hinton, and R.T. Di Giulio. 2008. Embryotoxicity of 2,3,7,8-tetrachlorodibenzo-*p*-

dioxin to the wood duck (*Aix sponsa*). Archives of Environmental Contamination and Toxicology 55:659-669.

Billiard, S.M., Meyer, J.N., Wassenberg, D.M., Hodson, P.V., and Di Giulio, R.T. 2008. Nonadditive effects of PAHs on early vertebrate development: mechanisms and implications for risk assessment. Toxicological Sciences 105:5-23.

Bohonowych, J.E.S., B. Zhao, A. Timme-Laragy, D. Jung, R.T. Di Giulio, and M.S. Denison. 2008. Newspapers and newspaper inks contain agonists for the AH receptor. Toxicological Sciences 102:278-290.

Di Giulio, R.T., and D.E. Hinton, eds. 2008. The Toxicology of Fishes. CRC Press, Taylor and Francis Group, Boca Raton, FL.

Di Giulio, R.T. and J.N. Meyer. 2008. Reactive oxygen species and oxidative stress. Pp. 273-324 in: Di Giulio, R.T., and D.E. Hinton, eds. The Toxicology of Fishes. CRC Press, Taylor and Francis Group, Boca Raton, FL.

Di Giulio, R.T. and M.C. Newman. Ecotoxicology. 2008. Pp. 1157-1187 in Klaassen, C.D., ed. Casarett and Doull's Toxicology. The Basic Science of Poisons, 7th edition. McGraw-Hill, New York, 1309 pp.

Larose, C., R. Canuel, M. Lucotte, P. Spear, and R.T. Di Giulio. 2008. Toxicological effects of methylmercury on walleye (*Sander vitreus*) and perch (*Perca flavescens*) from lakes of the boreal forest. Comparative Biochemistry and Physiology 147C:139-149.

Matson, C.W., B.W. Clark, M.J. Jenny, C.R. Fleming, M.E. Hahn, and R.T. Di Giulio. 2008. Development of the morpholino gene knockdown technique in *Fundulus heteroclitus*: a tool for studying molecular mechanisms in an established environmental model. Aquatic Toxicology 87:289-295.

Matson, C.W., A.R. Timme-Laragy, and R.T. Di Giulio. 2008. Fluoranthene, but not benzo[a]pyrene, interacts with hypoxia resulting in pericardial effusion and lordosis in developing zebrafish. Chemosphere 74:149-154.

Rotchell, J.M., D.E. Hinton, M.R. Miller, R.T. Di Giulio, and G.K. Ostrander. 2008. Chemical carcinogenesis in fishes. Pp. 531-596 in: Di Giulio, R.T., and D.E. Hinton, eds. The Toxicology of Fishes. CRC Press, Taylor and Francis Group, Boca Raton, FL.

Timme-Laragy, A.R., P.D. Noyes, D.R. Buhler, and R.T. Di Giulio. 2008. CYP1B1 knockdown does not alter synergistic developmental toxicity of polycyclic aromatic hydrocarbons in zebrafish (*Danio rerio*). Marine Environmental Research 66:85-87.

Benson, W.H., and R.T. Di Giulio, eds. 2007. Genomic Approaches for Cross-Species Extrapolations in Toxicology. Taylor and Francis, New York. (This book received a U.S. EPA Scientific and Technological Achievement Award in 2010.)

Burnett, K.G., L.J. Bain, W.S. Baldwin, G.C. Callard, S. Cohen, R.T. Di Giulio et al. 2007. *Fundulus* as the premier teleost model in environmental biology: opportunities for new insights using genomics. Comparative Biochemistry and Physiology Part D: Genomics and Proteomics 2D:257-286.

Timme-Laragy, A.R., C.J. Cockman, C.W. Matson, and R.T. Di Giulio. 2007. Synergistic induction of AHR regulated genes in developmental toxicity from two model PAHs in zebrafish. Aquatic Toxicology 85:241-250.

Arzuaga, X., Wassenberg, D., Di Giulio, R., and Elskus, A. 2006. The chlorinated AHR ligand 3,3',4,4',5-pentachlorobiphenyl (PCB126) promotes reactive

oxygen species (ROS) production during embryonic development in the killifish (*Fundulus heteroclitus*). Aquatic Toxicology 76:13-23.

Billiard, S., A.R. Timme-Laragy, D.M. Wassenberg, C. Cockman, and R.T. Di Giulio. 2006. The role of the aryl hydrocarbon receptor pathway in mediating synergistic developmental toxicity of polycyclic aromatic hydrocarbons to zebrafish. Toxicological Sciences 92:526-536.

Rau Embry, M., S.M. Billiard, and R.T. Di Giulio. 2006. Lack of p53 induction in fish cells by model chemotherapeutics. Oncogene 25:2004-2010.

Timme-Laragy, A.R. E.D. Levin, and R.T. Di Giulio, R.T. 2006. Developmental and behavioral effects of embryonic exposure to DE-71 in *Fundulus heteroclitus*. Chemosphere 62:1097-1104.

Barron, M.G., M. Carls, J. Short, S. Rice, R. Heintz, M. Rau, and R. Di Giulio. 2005. Assessment of the phototoxicity of weathered Alaska North Slope crude oil to juvenile pink salmon. Chemosphere 60:105-110.

Meyer, J.N., D.C. Volz, J.H. Freeedman, and R.T. Di Giulio. 2005, Differential display of hepatic mRNA from killifish (*Fundulus heteroclitus*) inhabiting a Superfund estuary. Aquatic Toxicology 73:327-341.

Nacci, D., L. Coiro, D.M. Wassenberg, and R.T. Di Giulio. 2005. A non-destructive technique to measure cytochrome P4501A enzyme activity in living embryos of the estuarine fish *Fundulus heteroclitus*. Pp. 209-226 in: Ostrander, G.K., Techniques in Aquatic Toxicology, Vol. 2. CRC Press, Boca Raton, FL.

Timme-Laragy, A.R. J. N. Meyer, R. A. Waterland, and R. T. Di Giulio. 2005. Analysis of CpG methylation in the killifish CYP1A promoter. Comparative Biochemistry and Physiology 141C:406-411.

Wassenberg, D., A. Nerlinger, L. Battle, and R. Di Giulio. 2005. Effects of the PAH-heterocycles, carbazole and dibenzothiophene, on *in vivo* and *in vitro* CYP1A activity and PAH-derived embryotoxicity. Environmental Toxicology and Chemistry 24:2526-2532.

Wassenberg, D.M., and R.T. Di Giulio. 2004. Synergistic embryotoxicity of polycyclic aromatic hydrocarbon aryl hydrocarbon receptor agonists with cytochrome P4501A inhibitors in *Fundulus heteroclitus*. Environmental Health Perspectives 112:1658-1664.

Rau, M.A., J. Whitaker, J.H. Freedman, and R.T. Di Giulio. 2004. Differential susceptibility of fish and rat liver cells to oxidative stress and cytotoxicity upon exposure to prooxidants. Comparative Biochemistry and Physiology 137C:335-342.

Bacanskas, L.R., J. Whitaker, and R.T. Di Giulio. 2004. Oxidative stress in two populations of killifish (*Fundulus heteroclitus*) with differing contaminant exposure histories. Marine Environmental Research 58:597-601.

Wassenberg, D.M., and R.T. Di Giulio. 2004. Teratogenesis in *Fundulus heteroclitus* embryos exposed to a creosote-contaminated sediment extract and CYP1A inhibitors. Marine Environmental Research 58:163-168.

Meyer, J.N., J.D. Smith, G.W. Winston, and R.T. Di Giulio. 2003. Antioxidant defenses in killifish (*Fundulus heteroclitus*) exposed to contaminated

sediments and model prooxidants: short-term and heritable responses. Aquatic Toxicology 65:377-395.

Meyer, J.N., D.M. Wassenberg, S.I. Karchner, M.E. Hahn, and R.T. Di Giulio. 2003. Expression and inducibility of aryl hydrocarbon receptor (AHR) pathway genes in wild-caught killifish (*Fundulus heteroclitus*) with different contaminant-exposure histories. Environmental Toxicology and Chemistry 22:2337-2343.

Meyer, J.N., and R.T. Di Giulio. 2003 Heriatble adaptation and fitness tradeoffs in killifish (*Fundulus heteroclitus*) inhabiting a polluted estuary. Ecological Applications 13:490-503.

Di Giulio, R.T., and W.H. Benson, editors. 2002. Interconnections between Human Health and Ecological Integrity. SETAC Press, Pensacola, FL.

Meyer, J., and R. Di Giulio. 2002. Patterns of heritability of decreased EROD activity and resistance to PCB 126-induced teratogenesis in laboratory-reared offspring of killifish (*Fundulus heteroclitus*) from a creosote-contaminated site in the Elizabeth River, VA, USA. Marine Environmental Research 54:621-626.

Meyer, J.N., D. Nacci, and R.T. Di Giulio. 2002. Cytochrome P4501A (CYP1A) in killifish (*Fundulus heteroclitus*): heritability of altered expression and relationship to survival in contaminated sediments. Toxicological Sciences 68:69-81.

Schlenk, D., and R.T. Di Giulio. 2002. Biochemical responses as indicators of aquatic ecosystem health. Pages 13-422 *in* S.M. Adams, editor, Biological Indicators of Aquatic Ecosystem Stress. American Fisheries Society, Bethesda, MD.

Wassenberg, D., E. Swails, and R. Di Giulio. 2002. Effects of combined exposures to benzo[a]pyrene and 3,3',4,4',5-pentachlorobiphenyl on *Fundulus heteroclitus*. Marine Environmental Research 54:279-283.

Willett, K.L., D. Wassenberg, L.A. Lienesch, W. Reichert, and R.T. Di Giulio. 2001. *In vivo* and *in vitro* inhibition of CYP1A-dependent activity in *Fundulus heteroclitus* by the polynuclear aromatic hydrocarbon (PAH) fluoranthene. Toxicology and Applied Pharmacology 177:264-271.

Toomey, B.H., S. Bello, M.E. Hahn, S. Cantrell, P. Wright, D.E. Tillett, and R.T. Di Giulio. 2001. TCDD induces apoptotic cell death and cytochrome P4501A expression in developing *Fundulus heteroclitus* embryos. Aquatic Toxicology 53:127-138.

Willett, K.L., L.A. Lienesch, and R.T. Di Giulio. 2001. No detectable DNA excision repair in UV-exposed hepatocytes from two catfish species. Comparative Biochemistry and Physiology 128C:349-358.

Kelly, S.A., and R.T. Di Giulio. 2000. Developmental toxicity of the estrogenic alkylphenols in the killifish (*Fundulus heteroclitus*). Environmental Toxicology and Chemistry 19:2564-2570.

Monteverdi, G.H., and R.T. Di Giulio. 2000. *In vitro* and *in vivo* association of 2,3,7,8-tetradichlorodibenzodioxin and benzo(a)pyrene with the yolk-

precursor protein vitellogenin. Environmental Toxicology and Chemistry 19:2502-2511.

Monteverdi, G.H., and R.T. Di Giulio. 2000. Oocytic accumulation and tissue distribution of 2,3,7,8-tetrachlorodibezodioxin (TCDD) and benzo(a)pyrene (BaP) in gravid *Fundulus heteroclitus*. Environmental Toxicology and Chemistry 19:2512-2518.

Monteverdi, G.H., and R.T. Di Giulio. 2000. Vitellogenin-association and oocyte accumulation of thyroxine (T_4) and 3,5,3'-triiodothyronine (T_3) in gravid *Fundulus heteroclitus*. General and Comparative Endocrinology 120:198-211.

Willett, K.L., P.R. Gardinali, L.A. Lienesch, and R.T. Di Giulio. 2000. Comparative metabolism and excretion of benzo(a)pyrene in 2 species of Ictalurid catfish. Toxicological Sciences 58:68-76.

Di Giulio, R.T., and D.E. Tillitt, eds. 1999. Reproductive and Developmental Effects of Contaminants in Oviparous Vertebrates. SETAC Press, Pensacola, FL.

Monteverdi, G.H., and R.T. Di Giulio. 1999. An enzyme-linked immunosorbant assay for estrogenicity using primary hepatocyte cultures from the channel catfish (*Ictalurus punctatus*). Archives of Environmental Contamination and Toxicology 37:62-69.

Ploch, S.A., Y.P. Lee, E. MacLean, and R.T. Di Giulio. 1999. Oxidative stress in liver of brown bullhead and channel catfish following exposure to *tert*-butyl hydroperoxide. Aquatic Toxicology 46:231-240.

Toomey, B.H., G.H. Monteverdi, and R.T. Di Giulio. 1999. Octylphenol induces vitellogenin production and cell death in fish hepatocytes. Environmental Toxicology and Chemistry 18:734-739.

Ploch, S.A., L.C. King, and R.T. Di Giulio. 1998. Comparative *in vitro* and *in vivo* benzo[a]pyrene-DNA adduct formation and its relationship to CYP1A activity in two species of Ictalurid catfish. Toxicology and Applied Pharmacology. 149:90-98.

Ploch, S.A., L.C. King, and R.T. Di Giulio. 1998. Comparative time-course of benzo[a]pyrene-DNA adduct formation, and its relationship to CYP1A activity in two species of catfish. Marine Environmental Research 46:345-349.

Watson, D.E., W.L. Reichert, and R.T. Di Giulio. 1998. Induction of hepatic CYP1A in channel catfish increases binding of 2-aminoanthracene to DNA *in vitro* and *in vivo*. Carcinogenesis. 19:1495-1501.

Eufemia, N., T.K. Collier, J.E. Stein, D.E. Watson, and R.T. Di Giulio. 1997. Biochemical responses to sediment-associated contaminants in brown bullhead (*Ameriurus nebulosus*) from the Niagara River ecosystem. Ecotoxicology 6:13-34.

Watson, D.E., and R.T. Di Giulio. 1997. Hepatic CYP1A in brown bullhead catalyzes the binding of 2-aminoanthracene to DNA *in vivo* and *in vitro*. Aquatic Toxicology 37:21-36.

Di Giulio, R.T., and E. Monosson, eds. 1996. Interconnections Between Human and Ecosystem Health. Chapman and Hall, London. 275 pp.

Di Giulio, R.T., and E. Monosson. 1996. Interconnections between human and ecosystem health: opening the lines of communication. Pp. 3-6 in Interconnections Between Human and Ecosystem Health, R.T. Di Giulio and E. Monosson, eds. Chapman and Hall, London.

Monosson, E., and R.T. Di Giulio. 1996. Ecosystem degradation: links to human health. Pp. 261-268 in Interconnections Between Human and Ecosystem Health, R.T. Di Giulio and E. Monosson, eds. Chapman and Hall, London.

Di Giulio, R.T., J.V. Behar, D.B. Carlson, B.M. Hasspieler, and D.E. Watson. 1995. Determinants of species susceptibility to oxidative stress: a comparison of channel catfish and brown bullhead. Marine Environmental Research. 39:175-179.

Di Giulio, R.T., W.H. Benson, B.M. Sanders, and P.A. Van Veld. 1995. Biochemical mechanisms of contaminant metabolism, adaptation and toxicity. Pp. 523-561 in "Fundamentals of Aquatic Toxicology." G.M. Rand, ed. Taylor and Francis, Bristol, PA.

Hasspieler, B.M., and R.T. Di Giulio. 1995. NADPH: phenanthrenequinone reductase in channel catfish (*Ictalurus punctatus*). Marine Environmental Research. 39:197-200.

Watson, D.E., L. Ménard, J.J. Stegeman, and R.T. Di Giulio. 1995. Aminoanthracene is a mechanism-based inactivator of cytochrome P4501A in channel catfish hepatic tissue. Toxicology and Applied Pharmacology. 135:208-215.

Hasspieler, B.M., J.V. Behar, D.B. Carlson, D.E. Watson, and R.T. Di Giulio. 1994. Susceptibility of channel catfish (*Ictalurus punctatus*) and brown bullhead (*Ameriurus nebulosus*) to oxidative stress: a comparative study. Aquatic Toxicology. 28:53-64.

Hasspieler, B.M., J.V. Behar, and R.T. Di Giulio. 1994. Glutathione-dependent defense in channel catfish (*Ictalurus punctatus*) and brown bullhead (*Ameriurus nebulosus*). Ecotoxicology and Environmental Safety. 28:82-90.

Hasspieler, B.M., and R.T. Di Giulio. 1994. Dicoumarol - sensitive NADPH: phenanthrenequinone oxidoreductase in channel catfish (*Ictalurus punctatus*). Toxicology and Applied Pharmacology. 125:184-191.

Darby, P.C., E.P. Gallagher, and R.T. Di Giulio. 1993. Glutathione enzymes, glutathione content and t-butyl hydroperoxide induced lipid peroxidation in the gill and digestive gland of the estuarine clam, *Rangia cuneata.* Comparative Biochemistry and Physiology. 106:809-814.

Di Giulio, R.T., C. Habig, and E.P. Gallagher. 1993. Effects of Black Rock Harbor sediments, on indices of biotransformation, oxidative stress, and DNA integrity in channel catfish. Aquatic Toxicology 26:1-22.

Di Giulio, R.T., E.P. Gallagher and C. Habig. 1993. The role of *in vitro* studies in ecological hazard assessments. Pp. 227-240 in "Wildlife

Toxicology and Population Modeling: Integrated Studies of Agroecosystems," edited by R.J. Kendall and T.E. Lacher. Lewis Publishers, Boca Raton, FL.

Benson, W.H., and R.T. Di Giulio. 1992. Biomarkers in hazard assessments of contaminated sediments. Pp. 241-256 in Sediment Toxicity Assessment, G.A. Burton, ed. Lewis Publishers, Boca Raton, FL.

Di Giulio, R.T. 1992. Indices of oxidative stress as biomarkers for environmental contamination. Pp. 15-31 in Aquatic Toxicology and Risk Assessment: Fourteenth Volume, ASTM STP 1124, M.A. Mayes and M.G. Barron, eds. American Society of Testing and Materials, Philadelphia, PA.

Gallagher, E.P., A.T. Canada, and R.T. Di Giulio. 1992. The protective role of glutathione in chlorothalonil-induced toxicity to channel catfish. Aquatic Toxicology 23: 155-168.

Gallagher, E.P., R.C. Cattley, and R.T. Di Giulio. 1992. The acute toxicity and sublethal effects of chlorothalonil in channel catfish. Chemosphere 24:3-10.

Gallagher, E.P., and R.T. Di Giulio. 1992. A comparison of glutathione-dependent enzymes in liver, gills and posterior kidney of channel catfish (*Ictalurus punctatus*). Comparative Biochemistry and Physiology 102C: 543-547.

Gallagher, E.P., and R.T. Di Giulio. 1992. Glutathione-mediated chlorothalonil detoxification in channel catfish gills. Marine Environmental Research 34:221-226.

Gallagher, E.P., B.M. Hasspieler, and R.T. Di Giulio. 1992. Effects of buthionine sulfoximine and diethyl maleate on glutathione turnover in the channel catfish. Biochemical Pharmacology 43: 2209-2215.

Hasspieler, B.M., and R.T. Di Giulio. 1992. DT diaphorase [NAD(P)H: (quinone acceptor) oxidoreductase] facilitates redox cycling of menadione in channel catfish (*Ictalurus punctatus*) cytosol. Toxicology and Applied Pharmacology 114:156-161.

Hasspieler, B.M., and R.T. Di Giulio. 1992. DT diaphorase [NAD(P)H: (quinone acceptor) oxidoreductase] in channel catfish: kinetics and distribution. Aquatic Toxicology 24:143-152.

Stegeman, J.J., M. Brouwer, R.T. Di Giulio, L. Forlin, B.A. Fowler, B.M. Sanders, and P.A. Van Veld. 1992. Enzyme and protein synthesis as indicators of contaminant exposure and effect. Pp. 235-335 in Biomarkers: biochemical physiological and histological marker of anthropogenic stress. R.J. Huggett, R.A. Kimerle, P.M. Mehrle, Jr., and H.L. Bergman, eds. Lewis Publishers, Boca Raton, FL.

Gallagher, E.P., and R.T. Di Giulio. 1991. Effects of 2, 4-D and picloram on biotransformation, peroxisomal and serum enzyme activities in channel catfish. Toxicology Letters 57:65-72.

Gallagher, E.P., G.L. Kedderis, and R.T. Di Giulio. 1991. Glutathione S-transferase mediated metabolism of chlorothalonil in liver and gill

subcellular fractions of channel catfish. Biochemical Pharmacology 42: 139-145.

Habig, C., and R.T. Di Giulio. 1991. Biochemical characteristics of cholinesterases in aquatic organisms. Pp. 19-33 in: Cholinesterase Measurements - Their Use in Evaluating the Impact of Pesticides on Wildlife, P. Mineau and C.E. Grue, eds. Elsevier, Amsterdam.

Mather-Mihaich, E., and R.T. Di Giulio. 1991. Oxidant, mixed-function oxidase, and peroxisomal responses in channel catfish exposed to bleached kraft mill effluent. Archives of Environmental Contamination and Toxicology 20:391-397.

Winston, G.W., and R.T. Di Giulio. 1991. Prooxidant and antioxidant mechanisms in aquatic organisms. Aquatic Toxicology 19:137-161.

Richardson, C.J., T.W. Sasek, and R.T. Di Giulio. 1990. The use of physiological markers for assessing air pollution stress in trees. In Wang, W., J.W. Gorsuch, and W.R. Lower, eds. Plants for Toxicity Assessment. ASTM STP 1091:143-155. American Society of Testing and Materials, Philadelphia, PA.

Di Giulio, R.T. 1989. Biomarkers. Pp. 7-1 - 7-34 in Warren-Hicks, W., B.R. Parkhurst, and S.S. Baker, Jr., eds. Ecological Assessment of Hazardous Waste Sites. U.S. EPA Report 600/3-89/013. Corvallis, OR.

Di Giulio, R.T., P.C. Washburn, R.J. Wenning, G.W. Winston, and C.S.E. Jewell. 1989. Biochemical responses in aquatic animals: a review emphasizing determinants of oxidative stress. Environmental Toxicology and Chemistry 8: 1103-1123.

Gallagher, E.P., and R.T. Di Giulio. 1989. Effects of complex waste mixtures on hepatic monooxygenase activities in brown bullheads (*Ictalurus nebulosus*). Environmental Pollution 62: 113-128.

Richardson, C.J., R.T. Di Giulio, and N.E. Tandy. 1989. Free radical mediated processes as markers of air pollution stress in trees. Pp. 251-260 in Biologic Markers of Air-pollution Stress and Damage in Forests. National Academy Press, Washington, D.C.

Tandy, N.E., R.T. Di Giulio, and C.J. Richardson. 1989. Assay and electrophoresis of superoxide dismutase from red spruce (*Picea rubens* Sarg.), loblolly pine (*Pinus taeda* L.), and scotch pine (*Pinus sylvestris* L.): a method for biomonitoring. Plant Physiology 90:742-748.

Washburn, P.C., and R.T. Di Giulio. 1989. The stimulation of superoxide production by nitrofurantoin, p-nitrobenzoic acid, and m-dinitrobenzene in hepatic microsomes of three species of freshwater fish. Environmental Toxicology and Chemistry 8:171-180.

Habig, C., and R.T. DI Giulio. 1988. The anticholinesterase effect of the cotton defoliant S,S,S tri-n-butyl phosphorotrithioate (DEF) on channel catfish. Marine Environmental Research 24:193-197.

Habig, C., R.T. Di Giulio, and M.B. Abou-Donia. 1988. Comparative properties of channel catfish (*Ictalurus punctatus*) and blue crab (*Callienectes*

sapidus) acetylcholinesterases. Comparative Biochemistry and Physiology 91C:293-300.

Washburn, P.C., and R.T. Di Giulio. 1988. Nitroaromatic stimulation of superoxide production in three species of freshwater fish. Marine Environmental Research 24:291-294.

Washburn, P.C., and R.T. Di Giulio. 1988. Nitrofurantoin stimulated superoxide production by channel catfish (*Ictalurus punctatus*) hepatic microsomal and soluble fractions. Toxicology and Applied Pharmacology 95:363-377.

Wenning, R.J., and R.T. Di Giulio. 1988. Comparative aspects of microsomal enzyme activities, antioxidant defenses, and superoxide production in ribbed mussels (*Guekensia demissa*) and wedge clams (*Rangia cuneata*). Comparative Biochemistry and Physiology 90C:21-28.

Wenning, R.J., and R.T. Di Giulio. 1988. The effects of paraquat on microsomal oxygen reduction and antioxidant defenses in ribbed mussels (*Guekensia demissa*) and wedge clams (*Rangia cuneata*). Marine Environmental Research 24:301-305.

Wenning, R.J., R.T. Di Giulio, and E.P. Gallagher. 1988. Oxidant-mediated biochemical effects of paraquat in the ribbed mussel, *Guekensia demissa*. Aquatic Toxicology 12:157-170.

Andaya, A.A., and R.T. Di Giulio. 1987. Acute toxicities and hematological effects of two substituted naphthoquinones in channel catfish. Archives of Environmental Contamination and Toxicology 16:233-238.

Di Giulio, R.T., and E.A. Ryan. 1987. Mercury in soils, sediments, and clams from a North Carolina peatland. Water, Air and Soil Pollution 33:205-219.

Habig, C., A. Nomeir, R.T. Di Giulio, and M.B. Abou-Donia. 1987. Extraction and analysis by gas chromatography of S,S,S,-tri-n-butyl phosphorotrithioate (DEF) from biological and environmental samples. Journal of the Association of Official Analytical Chemistry 70:103-106.

Pace, C.B., and R.T. Di Giulio. 1987. Lead concentrations in soil, sediment, and clam samples from the Pungo River peatland area of North Carolina, U.S.A. Environmental Pollution 43:301-311.

Habig, C., R.T. Di Giulio, A.A. Nomeir, and M.B. Abou-Donia. 1986. Comparative toxicity, cholinergic effects, and tissue levels of S,S,S-tri-n-butyl phosphorotrithioate (DEF) in channel catfish and blue crabs. Aquatic Toxicology 9:193-206.

Mather-Mihaich, E., and R.T. Di Giulio. 1986. Antioxidant enzyme activities and malondialdehyde, glutathione and methemoglobin concentrations in channel catfish exposed to DEF and n-butyl mercaptan. Comparative Biochemistry and Physiology 85C:427-432.

Di Giulio, R.T., and P.F. Scanlon. 1985. Effects of cadmium ingestion and food restriction on energy metabolism and tissue metal concentrations in mallard ducks (*Anas platyrhynchos*). Environmental Research 37:433-444.

Di Giulio, R.T., and P.F. Scanlon. 1985. Heavy metals in aquatic plants, clams, and sediments from the Chesapeake Bay, U.S.A. Implications for waterfowl. Science of the Total Environment 41:259-274.

Di Giulio, R.T., and P.F. Scanlon. 1984. Effects of cadmium and lead ingestion on tissue concentrations of cadmium, lead, copper and zinc in mallard ducks. Science of the Total Environment 39:103-110.

Di Giulio, R.T., and P.F. Scanlon. 1984. Heavy metals in tissues of waterfowl from the Chesapeake Bay, U.S.A. Environmental Pollution 35(A):29-48.

Di Giulio, R.T., and P.F. Scanlon. 1984. Sublethal effects of cadmium ingestion on mallard ducks. Archives of Environmental Contamination and Toxicology 13:765-771.

Kendall, R.J., P.F. Scanlon, and R.T. Di Giulio. 1982. The toxicology of ingested lead shot in ringed turtle doves. Archives of Environmental Contamination and Toxicology 11:259-263.

Di Giulio, R.T., and R.B. Hamilton. 1979. Utilization of agricultural wetlands in a Mississippi River bottomland by wood duck and hooded merganser broods. Proc. Ann. Conf. S.E. Assoc. Fish and Wildlife Agencies 33:81-87.

Strader R.W., R.T. Di Giulio, and R.B. Hamilton. 1978. Egg carrying by wood duck. Wilson Bulletin 90:131-132.

REPORTS AND OTHER PUBLICATIONS:

Committee on Human and Environmental Exposure Science in the 21st Century. 2012. Exposure Science in the 21st Century: A Vision and a Strategy. The National Academies Press, Washington, D.C. 195 pp.

Harding, A.K., P.B. Ryan, C. Adams, J.S. Ault, E.P.H. Best, C. Blanco, J.R. Coats, R. Di Giulio, and J. Graham. 2007. Review of the Office of Research and Development's Safe Pesticide/Safe Products (SP2) Research at the U.S. Environmental Protection Agency. BOSC Subcommittee on Safe Pesticides/Safe producers Research. U.S. EPA, Washington, D.C. 64 pp.

Eaton, D.L., D.M. Bier, J.T. Cohen, M.S. Denison, R.T. Di Giulio, et al. 2006. Health Risks from Dioxin and Related Compounds. Evaluation of the EPA Reassessment. National Research Council, National Academy Presses, Washington, D.C. 239 pp.

International Programme on Chemical Safety. 1999. IPCS/OECD/EPA Scoping Meeting on Approaches to Integrated Risk Assessment. ICPS, World Health Organization, Geneva, Switzerland.

Ringwood, A.H., M.J. Hameed, R.F. Lee, M. Brouwer, E.C. Peters, G.I. Scott, S.N. Luoma, and R.T. Di Giulio. 1999. Bivalve Biomarker Workshop: overview and discussion group summaries. Biomarkers 4:391-399.

Monteverdi, G., and R.T. Di Giulio. 1998. An *In Vitro* Test for Estrogenicity

Combining Cultured Hepatocytes and an Enzyme-linked Immunosorbant Assay (ELISA). Water Resources Research Institute, University of North Carolina, Raleigh. Report No. 318.

Gray et al (including R.T. Di Giulio). 1997. Endocrine Screening Methods Workshop Report: Detection of Estrogenic and Androgenic Hormonal and Antihormonal Activity for Chemicals That Act Via Receptor or Steroidogenic Enzyme Mechanisms. Reproductive Toxicology 11:719-75

Wainwright, J.S., K.M. Hopkins, T.A. Burns, Jr. and R.T. Di Giulio. 1995. Investigation of Potential Biomarkers of Exposure to Bleached Kraft Mill Effluent in North Carolina Rivers. Water Resources Research Institute, University of North Carolina, Raleigh. Report No. 295.

Di Giulio, R.T., J.K. Chipman, M. Feeley, W.E. Hawkins, K. Smith, G. Suter, and G. Winston. 1993. Interpretation of biomarker responses. Pp. 49-61 in Biomarkers. Research and Application in the Assessment of Environmental Health. D.B. Peakall and L.R. Shugart, eds. NATO ASI Series H, Vol. 68. Springer-Verlag Berlin.

Eufemia, N.A., B.B. Beaty, P. Reichert, D.E. Watson, T.A. Burns, and R.T. Di Giulio. 1993. Biomarkers for Redox-Active Genotoxins in Contaminated Sediments: A Mechanistic Approach. Final Report, U.S. Geological Survey - University of North Carolina Water Resources Research Institute Cooperative Program.

Dieter, M.P., and R.T. Di Giulio. 1989. A comparative biochemical approach for the evaluation of wildlife toxicity. (Editorial). Environmental Toxicology and Chemistry 8:1091-1092.

Di Giulio, R.T., and C.J. Richardson. 1989. Effects of Atmospheric Deposition on Red Spruce: A Free Radical-Based Approach. Final Report, Spruce-Fir Cooperative Program, U.S. Forest Service, Broomall, PA.

Tandy, N.E., R.T. Di Giulio, and C.J. Richardson. 1988. Isozymes of superoxide dismutase in red spruce and their importance in protecting against oxidative stress. Pp. 365-369 in Proceedings of the US/FRG Research Symposium: Effects of Atmospheric Pollutants on the Spruce-fir Forests of the Eastern United States and the Federal Republic of Germany. USDA Northeastern Forest Experiment Station, Broomall, PA. General Technical Report NE-120.

Di Giulio, R.T. 1987. The Assessment of Impacts of Complex Effluents on Aquatic Organisms: an Oxygen Toxicity Based Methodology. Final Technical Report, U.S. EPA Grant R811502-010.

D.W. Evans, R.T. Di Giulio, and E.A. Ryan. 1984. Mercury in peat and its drainage waters in eastern North Carolina. Water Resources Research Institute, University of North Carolina, Raleigh. Report No. 218.

Gale, J.A., and D.A. Adams, eds. 1984. Cumulative impacts of peat mining. Final Project Report. North Carolina Coastal Energy Impact Program, NC-DNRCD, Raleigh. CEIP Report No. 40.

PAPERS/ABSTRACTS FOR PROFESSIONAL MEETINGS:

2017

Inclusion of multiple aquarium model fish enhances research and interaction. 8th Annual Meeting, Aquatic Models of Human Disease, January 7-12, Birmingham. AL (with D.E. Hinton, H.M. Stapleton, W. Dong, M. Chernick, J. Mu, M. Zhu, J. Brandt, N. Jayasundara, J. Kozal, A. Massarsky, R. Trevisan, and C. Lindberg).

Tracing coal ash through aquatic food webs. Society of Freshwater Science Annual Meeting, June 4-8, Raleigh, NC (with J. Brandt and E. Bernhardt).

2016

Biochemical and genotoxic responses in sheepshead minnow (*Cyprinodon variegatus*) larvae exposed to oil spill contaminants and hypoxia as a modulating stressor. Gulf of Mexico Oil Spill and Ecosystem Science Conference, February 1-14, Tampa, FL (with S. Dasgputa and A. McElroy).

What can urban land use tell us about polychlorinated biphenyls (PCBs) in fin fish from the Elizabeth River. Atlantic Estuarine Research Society, March 10-12, Virginia Beach, VA (with J. Rieger and G. Kroeger-Foley).

Aryl hydrocarbon receptor dependent mitochondrial toxicity of PAHs. Society of Toxicology (SOT) 55th Annual Meeting, March 13-17, New Orleans, LA (with N. Jayasundara, J.S. Kozal, A.J. Bone, C.D. Lindberg, J. Bailey, S. Burwell, E.D. Levin, J.N. Meyer).

Characterization of cardiac deformity, CYP induction, and developmental bioenergetics following PAH exposures in in PAH resistant and non-resistant *Fundulus heteroclitus*. SOT 55th Annual Meeting, March 13-17, New Orleans, LA (with N. Jayasundara and J.S. Kozal).

Aryl hydrocarbon receptor 2 morpholino knockdown reduces the toxicity of total particulate matter from cigarette smoke in zebrafish (*Danio rerio*). SOT 55th Annual Meeting, March 13-17, New Orleans, LA (with A. Massarsky, A.J. Bone, G.L. Prasad).

Transgenerational mitochondrial toxicity of benzo(a)pyrene in *Danio rerio*. Society of Toxicology (SOT) 55th Annual Meeting, March 13-17, New Orleans, LA (with J. S. Kozal, N. Jayasundara, C.D. Lindberg, A. Massarsky, A.N. Oliveri, E.D. Levin, J.N. Meyer).

Pollution-driven evolution in the Elizabeth River. Tri-Service Environmental Risk Assessment Work Group, September 14, Naval Medical Center, Portsmouth, VA.

Sediment toxicity and adaptation in Elizabeth River populations at multiple sites. Elizabeth River Project Remediation Partnership, November 3, Portsmouth, VA.

Selenium ecotoxicology in freshwater lakes receiving coal combustion residual effluents: a North Carolina Example. Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting, November 6-10, Orlando, FL (with J. Brandt, E. Bernhardt and G. Dwyer).

Transgenerational toxicity of polycyclic aromatic hydrocarbons may prolong physiological impacts of exposures. SETAC Annual Meeting, November 6-10, Orlando, FL (with J.S. Kozal, N. Jayasundara, C.D. Lindberg, A. Massarsky, A.N. Oliveri, E.D. Levin, and J.N. Meyer).

Toxicity and fitness costs in PAH-resistant Fundulus heteroclitus exposed to creosote-contaminated sediment extract and hypoxia. SETAC Annual Meeting, November 6-10, Orlando, FL (With C.D. Lindberg, N. Jayasundara and J.S. Kozal).

2015

Impacts of total particulate matter from cigarette smoke on early development of zebrafish (*Danio rerio*). SOT 54th Annual Meeting, March 22-26, San Diego, CA (with A. Massarsky, N. Jayasundara, J.M. Bailey, G.L. Prasad, and E.D. Levin).

Energetic demands, fitness costs and tradeoffs in adapting to a polluted environment. Physiological Responses in Marine Organisms (PRIMO) 18, May 24-27, Trondheim, Norway (with N. Jayasundara, J.S. Kozal, and P.W. Fernando).

Aryl hydrocarbon receptor dependent persistent bioenergetics impairment following early life exposure to simple and complex PAH mixtures in *Danio rerio*. PRIMO 18, May 24-27, Trondheim, Norway (with J.S. Kozal, N. Jayasundara, A.J. Bone, C.D. Lindberg, J.M. Bailey, and E.D. Levin).

Aryl hydrocarbon receptor dependent mitochondrial toxicity of simple and complex PAH mixtures - assessing early life exposure and later life consequences. Gordon Research Conference: Cellular and Molecular Mechanisms of Toxicity, August 8-9, Andover, NH (with N. Jayasundara, J.S. Kozal, A.J. Bone, C.D. Lindberg, J.M Bailey, and E.D.Levin. (Selected for oral presentation).

Inter-connections between human health and ecological integrity: an organizational framework for research and development. SETAC Annual Meeting, November 8-12, Salt Lake City, UT (with W.H. Benson, T. Fontaine, and R. Hines).

Transgenerational mitochondrial toxicity of benzo(a)pyrene in *Danio rerio*. Superfund Center Program Annual Meeting, San Juan, Puerto Rico, November 18-20 (with J.S. Kozal, S.C.V. Burwell, N. Jayasundara, C.D. Linberg, A. Massarsky, A.N. Oliveri, E.D. Levin, and J.N. Meyer).

Effects of short term and multigenerational exposures to PAHs in fishes: Laboratory and field studies. Pacifichem (The International Chemical Congress of Pacific Basin Societies), Honolulu, Hawaii, December 15-20 (invited presentation, with J. Kozal and N. Jayasundara).

2014

The Elizabeth River Story: a case study in evolutionary toxicology. Keynote address, Carolinas SETAC Annual Meeting, April 24-25, Clemson, SC.

Transcriptomic analysis of AHR-dependent and AHR-independent genes involved in the synergistic cardiac developmental toxicity of PAHs. SOT 53rd Annual Meeting, March 17-21, Phoenix, AZ (with N. Jayasundara, L.V. Garner, J.N. Meyer, K. Erwin, and M. Kirby).

Toxicity of diesel exhaust particles with nano-ceria fuel additive in zebrafish. International Society of Exposure Science (ISES) Annual Meeting, October 12-16, Cincinnati, OH (with X. Cui, J. Osterberg, J. Gong, L. Zhang, K.F. Chung, and J. Zhang).

Low dose embryonic exposure to complex PAH mixtures alters later life behavior and swimming performance in *Fundulus heteroclitus*. SETAC Annual Meeting, November 9-13, Vancouver, BC (with D.R. Brown, N. Jayasundara, J. Bailey, A. Oliveri, D.E. Hinton, and E. Levin).

Bioaccumulation and trophic transfer of selenium in biofilms from a mining impacted stream. SETAC Annual Meeting, November 9-13, Vancouver, BC (with M.C. Arnold, T. Lindberg, R.L. Bier, and E. Bernhardt.

RAD Seq. analysis of variously PAH-Adapted Atlantic killifish, *Fundulus heteroclitus*, from throughout the Elizabeth River, VA. SETAC Annual Meeting, November 9-13, Vancouver, BC (with J.S. Osterberg, T.F. Schultz, K.M. Cammen, and B.W. Clark).

The costs of resistance: Energetic demands and fitness costs in adapting to a polluted environment. SETAC Annual Meeting, November 9-13, Vancouver, BC (with N. Jayasundara).

Toxicity of silver nanoparticles in complex environmental media to early life stage fishes is dependent on organic matter and UV light. SETAC Annual Meeting, November 9-13, Vancouver, BC (with A.J. Bone, C.W. Matson, and B.P. Colman

Developmental toxicity of coal ash leachate and coal combustion residue (CCR) waste streams to embryonic zebrafish (*Danio rerio*). SETAC Annual Meeting, November 9-13, Vancouver, BC (with J.E. Brandt, J.S. Osterberg, E. Bernhardt, and A. Vengosh).

Tricyclic PAH-mediated cardiotoxicity in Atlantic killifish (*Fundulus heteroclitus*) inhabiting a highly PAH contaminated environment. SETAC Annual Meeting, November 9-13, Vancouver, BC (with J.S. Kozal, N. Jayasundara, and J.S. Osterberg).

2013

An ecological perspective on Exposure Science in the 21st Century. SOT Annual Meeting, March 10-14, San Antonio, TX.

The aryl hydrocarbon receptor pathway and aromatic hydrocarbon-mediated teratogenicity in the Atlantic killifish (*Fundulus heteroclitus*). SOT Annual Meeting, March 10-14, San Antonio, TX, (with B. Clark and C. Matson).

Compound and mixture-specific differences in resistance to PAHs and PCB-126 among Fundulus heteroclitus subpopulations throughout the Elizabeth River estuary (Virginia, USA). PRIMO 17, May 5-8, Faro, Portugal (with B.W. Clark, J.S. Osterberg, E.M. Cooper, and H. M. Stapleton)

Photocatalysis of benzo(a)pyrene using titanium dioxide nanoparticles results in increased toxicity to larval zebrafish. PRIMO 17, May 5-8, Faro, Portugal (with A.J. Bone).

The role of differential metabolism and DNA adduct formation in the resistance of Atlantic killifish (*Fundulus heteroclitus*) to cancer. PRIMO 17, May 5-8, Faro, Portugal (with B.W. Clark, N.R. Herr, E.M. Cooper, L.B. Collins, B.C. Moeller, H.M. Stapleton, and J.A. Swenberg.

Sublethal embryonic exposure to complex PAH mixtures alters later life behavior and swimming performance in Fundulus heteroclitus. PRIMO 17, May 5-8, Faro, Portugal (with D.R. Brown, A.N. Oliveri, N. Jayasundara, D. Hinton, and E.D. Levin).

Selenium in otoliths of creek chub and green sunfish from a coal-mining impacted reach of the Mud River, West Virginia. 40th Aquatic Toxicology Workshop, Moncton, New Brunswick, Canada (with L. Friedrich, M. Arnold, T. Lindberg, N. Halden, and V. Palace).

Trophic transfer and bioaccumulation of selenium through a food chain in the mountaintop removal coal mining-impacted Mud River, WV. Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting, November 17-21, Nashville TN (with M.C. Arnold, T. Lindberg, Y. Liu, H. Hsu-Kim, L. Frie, and V.P. Palace).

RAD Seq of PAH-Adapted Atlantic Killifish, *Fundulus heteroclitus*, subpopulations from the Elizabeth River, VA. SETAC Annual Meeting, November 17-21, Nashville TN (with J.S. Osterberg, T.F. Schultz, K.M. Cammen, and B.W. Clark).

Transcriptomic analysis of AHR-dependent and AHR-independent genes involved in the synergistic cardiac developmental toxicity of PAHs. SETAC Annual Meeting, November 17-21, Nashville TN (with N. Jayasundara, L.V. Garner, J.N. Meyer, H. Tsai, K. Erwin, and M. Kirby).

Selenium in otoliths of creek chub and green sunfish from a coal mining-impacted reach of the Mud River, West Virginia. SETAC Annual Meeting, November 17-21, Nashville TN (with L. Friedrich, M.C. Arnold, T. Lindberg, N. Halden, and V.P. Palace).

Photocatalytic degradation of benzo(a)pyrene using titanium dioxide nanoparticles results in increased toxicity to zebrafish (*Danio rerio*). SETAC Annual Meeting, November 17-21, Nashville TN (with A. Bone).

2012

The effect of TiO2 NPs on PAH mixture toxicity to fish under environmental relevant conditions. 7th International Conference on the Environmental Effects of Nanoparticles and Nanomaterials, September 10-12, Banff, Alberta, Canada (with A. Bone).

Accumulation and toxicity of selenium in fish associated with mountaintop removal coal mining effluent. SETAC Annual Meeting, November 11-15, Long Beach, CA (with M. Arnold, T. Lindberg, Y. Liu, and H. Hsu-Kim).

2011

Comparative DNA damage and chronic liver toxicity of benzo[a]pyrene in tow populations of the Atlantic killifish (*Fundulus heteroclitus*) with different exposure histories. SOT Annual Meeting, March 6-10, Washington, DC (with L. Battle, D., Jung, K. Willett, and D. Hinton).

Quantitative method for the detection of benzo[a]pyrene-DNA adducts and 8-oxo-dG in Atlantic Killifish liver DNA. SOT Annual Meeting, March 6-10, Washington, DC (with N. Herr, L. Collins, B. Moeller, B. Clark, and J. Swenberg).

Optimization of high-throughput nanomaterial developmental toxicity testing in zebrafish embryos. SOT Annual Meeting, March 6-10, Washington, DC (with A. Wang, C. Matson, S. Frady, M. Arnold, S. Padilla, and K. Houck).

Toxicological uncertainties surrounding ecological impacts of the Deepwater Horizon oil spill. Gulf Oil Spill SETAC Focused Topic Meeting, Pensacola, FL, April 26-28, 2011.

Silver nanoparticle toxicity to Atlantic killifish (*Fundulus heteroclitus*) and zebrafish (*Danio rerio*) in complex environmental media: a comparison of laboratory, mesocosm and microcosm studies. International Conference on the Environmental Implications of NanoTechnology, May 9-11, Durham, NC (with A. Bone and C. Matson).

Heart-specific microarray identification of AHR-dependent and independent genes involved in the synergistic developmental toxicity of PAHs. Physiological Responses in Marine Organisms (PRIMO) 16, May 15-18, Long Beach, CA (with L. Van Tiem, J. Meyer, M. Kirby and H. Tsai).

Fundulus heteroclitus adapted to PAHs are cross-resistant to multiple insecticides. PRIMO 16, May 15-18, Long Beach, CA (with B. Clark).

Silver nanoparticle toxicity in *Fundulus heteroclitus*: particle versus dissolved metal toxicity. PRIMO 16, May 15-18, Long Beach, CA (with C. Matson, M. Auffan, T. Lindberg, M. Arnold, H. Hsu-Kim and M.R. Wiesner).

Silver nanoparticle toxicity to Atlantic killifish and zebrafish in complex environmental media: laboratory, mesocosm and microcosm studies. SETAC Annual Meeting, November 13-17, Boston, MA (with A.J. Bone, C.W. Matson, and B. Colman).

Mountain top removal coal Mining in WV: integrated field and laboratory studies elucidating biological consequences of a complex contaminant mixture. SETAC Annual Meeting, November 13-17, Boston, MA (with M. Arnold, T. Lindberg, Y. Liu, A. Watson, H. Hsu-Kim, and D.E. Hinton).

The role of differential metabolism and DNA-adduct formation in the resistance of Atlantic killifish (*Fundulus heteroclitus*) to cancer. SETAC Annual Meeting, November 13-17, Boston, MA (with B.W. Clark, N.R. Herr, E.M. Cooper, L.B. Collins, B.C. Moeller, H.M. Stapleton, and J.A. Swenberg).

The effect of CYP1A inhibition on embryotoxicity of weak aryl hydrocarbon receptor agonists in *Fundulus heteroclitus* and *Danio rerio*. SETAC Annual Meeting, November 13-17, Boston, MA (with D. Brown, B. Clark, L. Van Tiem, and K. Johnson).

Heart-specific microarray identification of AHR2-dependent and AHR2-independent genes involved in the synergistic developmental toxicity of PAHs. SETAC Annual Meeting, November 13-17, Boston, MA (with L. Van Tiem, J. Meyer, M. Kirby, K. Erwin, and H. Tsai).

2010

The role of dissolved silver in silver nanoparticle fish embryotoxicity. SETAC Annual Meeting, November 7-11, Portland, OR (with C.W.Matson, M. Auffan, T. Linberg, A.R. Badireddy, and M.R. Wiesner).

Patterns of heritability of resistance to cardiac teratogenesis and CYP1 induction by aryl hydrocarbons in *Fundulus heteroclitus*. SETAC Annual Meeting, November 7-11, Portland, OR (with A.J. Bone and B.W. Clark).

The role of zebrafish AHR1 isoforms in polycyclic aromatic hydrocarbon toxicity. SETAC Annual Meeting, November 7-11, Portland, OR (with L.Van Tiem and D. Brown).

Heart-specific microarray identification of AHR-dependent and independent genes involved in the synergistic developmental toxicity of PAHs. SETAC Annual Meeting, November 7-11, Portland, OR (with L.Van Tiem, J. Meyer, P. Hurban, H. Tsai and M. Kirby).

Physical and toxicological study on cerium oxide nanoparticles in Caenorhabditis elegans. SETAC Annual Meeting, November 7-11, Portland, OR (with M. Arnold, A.R. Badireddy, M.R. Wiesner, and J.N. Meyer).

2009

Compound- and mixture-specific resistance to PAHs in *Fundulus heteroclitus* subpopulations throughout the Elizabeth River estuary (Virginia, USA). SETAC Annual Meeting, November 19-23, New Orleans, LA (with B.W. Clark).

Synergistic induction of cardiac toxicity and redox-responsive genes in zebrafish embryos after co-exposure to benzo[k]fluoranthene and fluoranthene. SETAC Annual Meeting, November 19-23, New Orleans, LA (with L. Van Tiem).

Assessment of genotoxicity in the Atlantic killifish (*Fundulus heteroclitus*) from a creosote-contaminated Superfund site. New England Superfund Research Program meeting, October 4, Woods Hole Oceanographic Institute, MA (with D. Jung, C.W Matson, L.B. Collins, G. Laban, H. Stapleton, J.A. Swenberg and J.W. Bickham).

Silver nanoparticles behavior and fish embryotoxicity across a salinity gradient. First International Conference on the Environmental Implications of Nanotechnology, September 9-11, Washington, D.C., and SETAC Annual Meeting, November 19-23, New Orleans, LA (with C. Matson, M. Auffan, and M. Wiesner).

Benzo[a]pyrene metabolism, DNA damage and liver injury in an adapted population of *Fundulus heteroclitus*. Physiological Responses in Marine Organisms (PRIMO) 15, May 17-20, Bordeaux, France (with L. Battle, D. Jung, D. Hinton, and K. Willett).

Investigation of the AHR pathway function and PAH adaptation in *Fundulus heteroclitus* using morpholino gene knockdown. PRIMO 15, May 17-20, Bordeaux, France (with B.W. Clark, C.W. Matson and D. Jung).

Identification and characterization of killifish (*Fundulus heteroclitus*) mitochondrial CYP1A1 and its relationship to effects of polycyclic aromatic hydrocarbons on energy metabolism. PRIMO 15, May 17-20, Bordeaux, France (with D. Jung, and C.P. Thompson).

The synergistic developmental toxicity of PAHs is not accompanied by synergistic induction of various phase I and redox-responsive genes. PRIMO 15, May 17-20, Bordeaux, France (with L.A. Van Tiem).

2008

How to measure oxidative status in humans? Society for Free Radicals in Biology and Medicine Annual Meeting, November 19-23, Indianapolis, IN (with D.

Il'yasova, G. Mixon, P.K. Marcom, J. Marks, I. Spasojevich, N. Craft, and F. Arredondo.

Effects of benzo[a]pyrene on mitochondrial DNA damage in the killifish (*Fundulus heteroclitus*). Society of Toxicology (SOT) Annual Meeting, March 16-20, Seattle, WA (with D. Jung and J. Meyer).

Effect of the CYP1A inhibitor fluoranthene on the biotransformation of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. SOT Annual Meeting, March 16-20, Seattle, WA (with L. Battle, S. Zhu, and K. Willett).

NRF2 plays a protective role in response to pro-oxidant exposure of zebrafish embryos (*Danio rerio*). SOT Annual Meeting, March 16-20, Seattle, WA (with L. Van Tiem and A. Timme-Laragy).

Is oxidative stress a significant factor in the synergistic developmental toxicity of model PAHs in zebrafish? SOT Annual Meeting, March 16-20, Seattle, WA (with A. Timme-Laragy, L. Van Tiem and D. Jung).

Overexpression of ARNT does not alter crosstalk between the aryl hydrocarbon receptor and hypoxia pathways in PLHC-1 cells. SOT Annual Meeting, March 16-20, Seattle, WA (with C.R. Fleming, S. Billiard, and D.E. Hinton).

Mechanisms underlying the synergistic embryotoxicity of PAH AHR agonists and CYP1A inhibitors if fish models. Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting, November 16-20, Tampa, FL (with C.W. Matson and A.R. Timme-Laragy).

Fundulus heteroclitus (mummichog) adapted to PAHs are cross-resistant to multiple insecticides. SETAC Annual Meeting, November 16-20, Tampa, FL (with B. Clark).

Expression of mitochondrial cytochrome P450s in response to PAHs in killifish (*Fundulus heteroclitus*). SETAC Annual Meeting, November 16-20, Tampa, FL (with D. Jung and J. Meyer).

Crosstalk between the AHR and hypoxia pathways in a topminnow cell line occurs with BaP but not PCB126 and is partially mediated by ARNT. SETAC Annual Meeting, November 16-20, Tampa, FL (with C. Fleming and S. Billiard).

Effect of the CYP1A inhibitor on the biotransformation of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. SETAC Annual Meeting, November 16-20, Tampa, FL (with L. Battle, S. Zhu and K. Willett).

Heart-specfic microarray identification of genes involved in the synergistic developmental toxicity of PAHs: comparison of AHR-dependent and AHR-independent pathways using morpholino gene knockdown. SETAC Annual Meeting, November 16-20, Tampa, FL (with L. Van Tiem, J. Meyer and E. Lobenhofer).

2007

Considerations for the determination of polycyclic aromatic hydrocarbon exposure risk upon consumption of fish from the southern branch of the Elizabeth

River in Portsmouth, Virginia. Integrating Environment and Human Health, the 7th National Conference on Science, Policy and the Environment, National Council for Science and the Environment, February 1-2, Washington, DC (with A. Nerlinger and M. Cullen).

Developmental and molecular interactions between the hypoxia and aryl hydrocarbon receptor (AHR) pathways in zebrafish. SOT Annual Meeting, March 25-29, Charlotte, NC (with C.W. Matson, C.R. Fleming, A.R. Timme-Laragy, D. Jung and L.P. Battle).

Aryl hydrocarbon receptor regulated gene expression during synergistic developmental toxicity of polycyclic aromatic hydrocarbons in zebrafish (*Danio rerio*). SOT Annual Meeting, March 25-29, Charlotte, NC (with A.R. Timme-Laragy, C. Cockman and C. Matson).

Redox and the AHR: mechanisms of synergistic developmental PAH toxicity in zebrafish. PRIMO 14, May 6-9, Florianopolis, Brazil (with A.R. Timme-Laragy).

mRNA expression of aryl hydrocarbon receptor pathway members during polycyclic aromatic hydrocarbon synergistic developmental toxicity in zebrafish. PRIMO 14, May 6-9, Florianopolis, Brazil (with A.R. Timme-Laragy, C.J. Cockman and C.W. Matson).

Developmental and molecular interactions between the hypoxia and aryl hydrocarbon receptor (AHR) pathways in zebrafish (*Danio rerio*) and Atlantic killifish (*Fundulus heteroclitus*). PRIMO 14, May 6-9, Florianopolis, Brazil (with C.R. Fleming, C.W. Matson, and D.E. Hinton).

Effects of polycyclic aromatic hydrocarbons on mitochondrial DNA damage in the killifish (*Fundulus heteroclitus*). PRIMO 14, May 6-9, Florianopolis, Brazil (with D. Jung and J.N. Meyer).

2006

Role of the aryl hydrocarbon receptor pathway in the synergistic developmental toxicity of polycyclic aromatic hydrocarbons in zebrafish. SOT Annual Meeting, March 5-9, San Diego, CA (with S. Billiard, A. Timme-Laragy, D. Wassenberg, C. Cockman, and E. Linney).

Lessons from the wild: studies of fish coping with polluted environments. Cancer and the Environment Conference, Duke University Comprehensive Cancer Center and Nicholas School of the Environment and Earth Sciences, March 30-31, Durham, NC.

Developmental effects of polycyclic aromatic hydrocarbons: studies in *Fundulus* and zebrafish. Fundulus Genomics Workshop, May 4-5, Charleston, SC.

A morpholino approach to understand synergistic developmental toxicity of PAH in zebrafish (*Danio rerio*). Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting, November 5-9, Montreal, Canada (with A.R. Timme-Laragy, S.M. Billiard and C.J. Cockman).

mRNA expression of aryl hydrocarbon receptor pathway members during polycyclic aromatic hydrocarbon synergistic developmental toxicity in zebrafish (*Danio rerio*). SETAC Annual Meeting, November 5-9, Montreal, Canada (with A.R. Timme-Laragy, C.J. Cockman and C.W. Matson).

Developmental and molecular interactions between hypoxia and aryl hydrocarbon receptor (AHR) pathways in zebrafish. SETAC Annual Meeting, November 5-9, Montreal, Canada (with C.W. Matson and A.R. Timme-Laragy).

Interactive effects of hypoxia and polycyclic aromatic hydrocarbons (PAHs) in the developing killifish, *Fundulus heteroclitus*. SETAC Annual Meeting, November 5-9, Montreal, Canada (with C. Fleming and D. Hinton).

Effects of polycyclic aromatic hydrocarbons on mitochondrial DNA damage in killifish, *Fundulus heteroclitus*. SETAC Annual Meeting, November 5-9, Montreal, Canada (with D. Jung and J.N. Meyer).

Comparative chronic liver toxicity of benzo(a)pyrene in two populations of *Fundulus heteroclitus* with different sensitivities. SETAC Annual Meeting, November 5-9, Montreal, Canada (L.P. Battle, K.L. Willett and D.E. Hinton).

Assessing the toxicological effects of mercury in fish using biomarkers. SETAC Annual Meeting, November 5-9, Montreal, Canada (with C. Larose, R. Canuel, M. Lucotte, P. Spear, and B. Angers).

2005

Mechanisms of interactive developmental toxicity of polycyclic aromatic hydrocarbons in zebrafish. SOT Annual Meeting, March 6-10, New Orleans, LA, Physiological Responses in Marine Organisms (PRIMO) 13, June 19-23, Alessandria, Italy, and SETAC, November 13-17, Baltimore, MD (with S. Billiard, D. Wassenberg, A. Timme-Laragy, and E. Linney).

Synergistic developmental toxicity of polycyclic aromatic hydrocarbons: towards a mechanistic understanding. SOT Annual Meeting, March 6-10, New Orleans, LA; PRIMO 13, June 19-23, Alessandria, Italy; Estuarine Research Foundation Annual Meeting, October 15-19, Norfolk, VA (with S. Billiard, J. Meyer, D. Wassenberg, and P. Hodson).

Resistance to PCB induced CYP1A activity and reactive oxygen species (ROS) production in contaminated killifish (Fundulus heteroclitus) populations. PRIMO 13, June 19-23, Alessandria, Italy (with X. Arzuaga, E. Harmel, D.M. Wassenberg, and A.A. Elskus).

Embryotoxicity of 2,3,7,8-TCDD to the wood duck (*Aix sponsa*). SETAC Annual Meeting, November 13-17, Baltimore, MD (with T.P. Augspurger and D.E. Tillitt).

2004

Highlights from a recent Pellston workshop on emerging molecular and computational approaches for cross-species extrapolations. National Academy of Sciences workshop, August 12-13, 2004, Washington, D.C.

Developmental and behavioral effects of embryonic exposure to DE-71 in *Fundulus heteroclitus*. The Third International Workshop on Brominated Fire Retardants, June 6-9, Toronto, Ontario, Canada, and SETAC Annual Meeting, November 18-24, Portland, OR (with A.R. Timme-Laragy).

Mechanisms of PAH- and PCB-mediated impacts on embryonic development in the killifish, *Fundulus heteroclitus*. SOT Annual Meeting, March 20-25, Baltimore, MD (with D.M. Wassenberg).

Emerging molecular and computational approaches for cross-species extrapolations: a workshop summary. SETAC Annual Meeting, November 18-24, Portland, OR (with W.H. Benson, J.C. Cook, J.F. Freedman, R.L. Malek, C. Thompson, and D. Versteeg).

Lack of p53 induction in fish cells by model chemotherapeutics. SETAC Annual Meeting, November 18-24, Portland, OR (with M.A. Rau and S.M. Billiard).

Resistance to PCB induced CYP1A activity and oxidative stress in a chronically contaminated killifish (*Fundulus heteroclitus*) population. SETAC Annual Meeting, November 18-24, Portland, OR (with X. Arzuaga, A.A. Elskus, E. Harmel, and D.M. Wassenberg).

Do TIE laboratory based assessment methods really predict field effects? SETAC Annual Meeting, November 18-24, Portland, OR (with K.T. Ho et al.).

Interactive effects of pentachlorophenol with polycyclic aromatic hydrocarbons on teratogenesis and cytochrome P4501A activity in *Fundulus heteroclitus*. SETAC Annual Meeting, November 18-24, Portland, OR (with L.P. Battle).

2003

Developmental deformities and CYP1A induction in *Fundulus heteroclitus* embryos exposed to PAH-type inducers and CYP1A inhibitors. PRIMO 12, Tampa, FL, May 9-13 (with D.M. Wassenberg and J.N Meyer).

Analysis of CpG methylation in the promoter region of the CYP1A gene in *Fundulus heteroclitus* from creosote-contaminated and reference sites. PRIMO 12, Tampa, FL, May 9-13 (with J.N. Meyer, A.R. Timme, R.A. Waterlund, W.H. Powell, S.L. Krachner, and M.E. Hahn).

Differential susceptibility of fish and rat liver cells to oxidative stress and cytotoxicity upon exposure to prooxidants. PRIMO 12, Tampa, FL, May 9-13, and SETAC 24th Annual Meeting, November 9-13, Austin, TX (with M.A. Rau, J. Whitaker and J.H. Freedman).

Identification of chemical classes contributing to the toxicity of sediments from a contaminated site on the Elizabeth River, VA, USA. PRIMO 12, Tampa, FL, May 9-13 (with Y.-T. tang, L.A. Leinessch, E.M. Cooper, D. Vasudevan, and J.N Meyer).

Oxidative stress in two killifish populations with differing contaminant exposure histories. PRIMO 12, Tampa, FL, May 9-13 (with L. R. Bacanskas, J. Whitaker, and J.N. Meyer).

Adaptations in *Fundulus heteroclitus* inhabiting a polluted estuary: mechanisms, fitness costs and genetic consequences. Annual Meeting of the Brazilian Federation of Experimental Biology (FESBE 2003), August 27-30, Curitiba, Brazil.

Mechanisms of cardiovascular teratogenesis in *Fundulus heteroclitus*. Aquatic Animal Models of Human Disease, Manassas, VA, September 29 – October 2 (with D. Wassenberg, S. Billiard, and J. Meyer).

Teratogenesis and CYP1A induction in *Fundulus heteroclitus* embryos exposed to polycyclic aromatic hydrocarbon mixtures. SETAC Annual Meeting, November 9-13, Austin, TX (with D.M. Wassenberg).

P53 induction response in two fish liver cell lines. SETAC 24th Annual Meeting, November 9-13, Austin, TX (with M.A. Rau and S.M. Billiard).

Evidence for the role of p53 in metal-induced activation of metallothionein gene expression. SETAC Annual Meeting, November 9-13, Austin, TX (with E.S. Craft, M.A. Rau, M.G. Cherian, and J.H. Freedman).

Differential display of hepatic mRNA from *Fundulus heteroclitus* inhabiting a Superfund estuary. SETAC Annual Meeting, November 9-13, Austin, TX (with J.N. Meyer, D.C. Volz, and J.H. Freedman).

Characterization of the hypoxic functional response using a fish model system. SETAC Annual Meeting, November 9-13, Austin, TX (with S.M. Billiard, M.A. Rau, and B.B. Rees).

Analysis of CpG methylation in the promoter region of the CYP1A gene in *Fundulus heteroclitus* from creosote-contaminated and reference sites. SETAC Annual Meeting, November 9-13, Austin, TX (with A. R. Timme, J.N. Meyer, D.M. Wassenberg, R.A Waterland, S.I. Karchner, and M.E. Hahn).

2002

Nongenetic heritability of an altered cytochrome P451A phenotype in killifish (*Fundulus heteroclitus*) from a contaminated site. Developmental Toxicology in the 21st Century, NIEHS, April 22-24, RTP, NC, (with J.N. Meyer).

CYP1B mRNA expression in two catfish species. SOT Annual Meeting, March 17-21, Nashville, TN (with C. Metzger and K.L. Willett).

Alterations in the expression and inducibility of genes in the aryl hydrocarbon receptor (AhR) pathway in wild-caught killifish (*Fundulus heteroclitus*) from a creosote contaminated sediment. SETAC Annual Meeting, November 16-20, Salt Lake City, UT (with D.M. Wassenberg and E.E. Swails).

Antioxidant defenses in killifish (*Fundulus heteroclitus*) exposed to Superfund sediments: short-term and evolutionary responses. SETAC Annual Meeting, November 16-20, Salt Lake City, UT (with J. Meyer, J.D. Smith, and G.W. Winston).

Teratogenesis and EROD induction in *Fundulus heteroclitus* exposed to extracts of a creosote-contaminated site. SETAC Annual Meeting, November 16-20, Salt Lake City, UT (with D.M. Wassenberg J.N. Meyer, J.S. Manke, S.I. Karchner, and M.E. Hahn).

2001

Environmental – Human Health Interconnections. Society of Toxicology (SOT) Annual Meeting, March 25-29, San Francisco, CA (with W.H. Benson).

The role of the tumor suppressor gene, p53, in pollutant-mediated carcinogenesis in two Ictalurid species of catfish. 11th International Symposium on Pollutant Responses in Marine Organisms (PRIMO 11), Plymouth, UK, July 10-13, and SETAC 22nd Annual Meeting, November 11-15, Baltimore, MD (with M. Rau).

Effects of combined exposures to benzo[a]pyrene and 3,3',4,4',5-pentachlorobiphenyl on *Fundulus heteroclitus*. PRIMO 11, Plymouth, UK, July 10-13 (with D. Wassenberg and E. Swails).

Mechanisms of adaptation and fitness costs in F1 and F2 offspring of killifish (*Fundulus heteroclitus*) from a contaminated site. PRIMO 11, Plymouth, UK, July 10-13, and SETAC Annual Meeting, November 11-15, Baltimore, MD (with J. Meyer).

Effect of chemical mixtures on indicators of oxidative stress in fish liver cells (PLHC-1). SETAC Annual Meeting, November 11-15, Baltimore, MD (with J.W. Whitaker).

Interactive biochemical effects of AHR agonsits with prooxidants in *Fundulus heteroclitus*. SETAC Annual Meeting, November 11-15, Baltimore, MD (with D.M. Wassenberg, E.S. Swails, and J. Nakamura).

Identification and distribution of a CYP1B-like message in two fish species. SETAC Annual Meeting, November 11-15, Baltimore, MD (with K.L. Willett, B. Sun, C. Metzger, and L. Lienesch).

2000

Differential benzo[a]pyrene metabolism and excretion in two related fish. SOT Annual Meeting, March 19-23, Philadelphia, PA (with K.L. Willett, P. Gardinali, and J. Rogers).

Early life stage toxicity of the estrogenic alkylphenols in an estuarine killifish: evidence for endocrine disruption? Atlantic Coasts Contaminants Workshop 2000, June 22-25, Bar Harbor, ME (with S.A. Kelly).

In vivo inhibition of CYP1A by the PAH fluoranthene. SETAC Annual Meeting, November 12-16, Nashville, TN (with K.L. Willett, D.M. Wassenberg, L.A. Lienesch, and W.L. Reichert).

Mechanisms of adaptation and fitness costs in F1 and F2 offspring of wild-caught killifish (*Fundulus heteroclitus*) from a contaminated site. SETAC Annual Meeting, November 12-16, Nashville, TN (with J.N. Meyer).

Environmental-Human Health Interconnections: A Workshop Report. SETAC Annual Meeting, November 12-16, Nashville, TN (with W.H. Benson).

Molecular Cloning of the Tumor Suppressor Gene, p53, in Two Species of Ictalurid Catfish. SETAC Annual Meeting, November 12-16, Nashville, TN (with M.A. Rau and J.M. Gross).

Can maternal fluoranthene exposure provide photo-protection in offspring of the killifish (*Fundulus heteroclitus*)? SETAC Annual Meeting, November 12-16, Nashville, TN (with T.A. Parson, J.N. Meyer, and K.L. Willett).

Developmental toxicity of alkylphenols in *Fundulus heteroclitus*: evidence for endocrine disruption? SETAC Annual Meeting, November 12-16, Nashville, TN (with S.A. Kelly).

Characterization of toxicity associated with chemical resistance of *Fundulus heteroclitus* from a Superfund site. SETAC Annual Meeting, November 12-16, Nashville, TN (with L.A. Lienesch, J.N. Meyer, and J.G. Burkhardt).

1999

Differential phase I and phase II enzyme activities in brown bullhead and channel catfish exposed to β-naphthoflavone. PRIMO 10, April 25-29, Williamsburg, VA (with K. Willett and J. Rogers).

Increased sensitivity to oxidative stress in a creosote-adapted population of mummichog (*Fundulus heteroclitus*). PRIMO 10, April 25-29, Williamsburg, VA (with J.N. Meyer and E.D. MacLean).

Interaction of estrogenic alkylphenols and tamoxifen in *Fundulus heteroclitus* embryos and larvae. PRIMO 10, April 25-29, Williamsburg, VA (with S. Kelly).

Vitellogenin-associated maternal transfer of exogenous and endogenous ligands in the estuarine fish, *Fundulus heteroclitus*. PRIMO 10, April 25-29, Williamsburg, VA (with G.H. Monteverdi).

Benzo(a)pyrene metabolism and excretion in channel catfish and brown bullhead. SETAC Annual Meeting, November 14-18, Philadelphia, PA (with K.L. Willett, R. Rogers, and P. R. Gardinali).

Determination of Benzo(a)pyrene metabolites in fish bile by atmospheric pressure chemical ionization mass spectrometry. SETAC Annual Meeting, November 14-18, Philadelphia, PA (with P. R. Gardinali and K. L. Willett).

Early life stage toxicity of estrogenic alkylphenol exposure in the estuarine killifish *Fundulus heteroclitus*. SETAC Annual Meeting, November 14-18, Philadelphia, PA (with S.A. Kelly).

Measures of fitness in F_1 and F_2 offspring of wild-caught mummichog (*Fundulus heteroclitus*) from a contaminated site, SETAC Annual Meeting, November 14-18, Philadelphia, PA (with J.N. Meyer and E.D. McLean).

Vitellogenin-associated maternal transfer of exogenous and endogenous ligands in the Estuarine fish, *Fundulus heteroclitus*, SETAC Annual Meeting, November 14-18, Philadelphia, PA (with G.H. Monteverdi).

1998

Assessment of AP site formation in isolated hepatocytes from brown bullhead upon treatment with benzo[a]pyrene. SOT Annual Meeting, March 1-5, Seattle, WA (with S.A. Ploch, J. Nakamura, and J.A. Swenberg).

Antioxidant adaptations in killifish (*Fundulus heteroclitus*) populations from PAH-impacted and PCB-impacted sites. SETAC Annual Meeting, November 15-19, Charlotte, NC (with J.A. Carey, and E.D. MacLean).

Embryo and larval toxicity of alkylphenol exposure in *Fundulus heteroclitus.* SETAC Annual Meeting, November 15-19, Charlotte, NC (with S.A. Kelly).

Phototoxicity of anthracene and fluoranthene in killfish (*Fundulus heteroclitus*) from PAH-impacted and non-impacted sites. SETAC Annual Meeting, November 15-19, Charlotte, NC (with E.D. MacLean, and J.A. Carey).

The role of vitellogenin in maternal transfer. SETAC Annual Meeting, November 15-19, Charlotte, NC (with G.H. Monteverdi, and M.J. DeVito).

1997

Comparative time-course of benzo[a]pyrene-DNA adduct formation and its relationship to CYP1A activity in two species of catfish. PRIMO 9, April 27-30, Bergen, Norway (with S.A. Ploch and L.C. King).

Developmental toxicity of alkylphenol exposure in *Fundulus heteroclitus* embryos. SETA) Annual Meeting, November 16-20, San Francisco, CA (with S. Kelly and B. Toomey).

TCDD-induced cell death in *Fundulus heteroclitus* embryos. SETAC Annual Meeting, November 16-20, San Francisco, CA (with B. Toomey, S. Cantrell, P. Wright, and D. Tillitt).

Discordance between EROD activity and BaP-DNA adduct formation in liver of two species of catfish. SETAC Annual Meeting, November 16-20, San Francisco, CA (with S. Ploch and L. King).

8 – Hydroxy – 2′ – deoxyquanosine as a marker of oxidative DNA damage in catfish liver. SETAC Annual Meeting, November 16-20, San Francisco, CA (with S. Ploch, Y. Lee, and E. Maclean).

Vitellogenin binds and transports xenobiotics to developing oocytes. SETAC Annual Meeting, November 16-20, San Francisco, CA (with G. Monteverdi).

1996

Comparative *in vitro* metabolism and activation of benzo[a]pyrene from two species of catfish. SETAC Annual Meeting, November 17-21, Washington, DC (with S.A. Ploch).

Octylphenol induces apoptosis in fish cells. SETAC Annual Meeting, November 17-21, Washington, DC (with B.H. Toomey and S.A. Ploch).

Vitellogenin binds and transports xenobiotics to developing oocytes. SETAC Annual Meeting, November 17-21, Washington, DC (with G. Monteverdi).

1995

Aminoanthracene is a mechanism-based inactivator of cytochrome P4501A in channel catfish hepatic tissue. PRIMO 8, April 2-5, Pacific Grove, CA (with D.E. Watson, L. Ménard, and J.J. Stegeman).

Formation of DNA adducts in hepatic tissue of channel catfish by 2-aminoanthracene is enhanced by elevation of P4501A *in vivo* and *in vitro*. PRIMO 8, April 2-5, Pacific Grove, CA (with D.E. Watson and S.A. Ploch).

Inactivation of channel catfish CYP1A by 2-aminoanthracene. SETAC Annual Meeting, November 5-9, Vancouver, BC (with D.E. Watson, L. Ménard, and J.J. Stegeman).

1994

Mechanistic linkages between human and ecosystem health: potentials and limitations for holistic assessments. Invited presentation. First International Symposium on Ecosystem Health and Medicine. June 19-23, Ottawa, Ontario.

Pretreatment of channel catfish with β-naphthoflavone increases binding of 2-aminoanthracene to hepatic DNA. SETAC Annual Meeting, October 30 - November 3, Denver, CO (with D.E. Watson and S.A. Ploch).

1993

NADPH: phenanthrenequinone reductase and oxidative stress in channel catfish (*Ictalurus punctatus).* SOT Annual Meeting, March 14-18, New Orleans, LA (with B.M. Hasspieler). Toxicologist 12:184 (Abstr.).

Determinants of species susceptibility to oxidative stress: a comparison of channel catfish and brown bullhead. PRIMO 7, April 20-22, Göteborg, Sweden (with J. Behar, D. Carlson, B.M. Hasspieler, and D.E. Watson).

NADPH: phenanthrenequinone reductase, a novel quinone oxidoreductase in channel catfish. PRIMO 7, April 20-22, Göteborg, Sweden (with B.M. Hasspieler).

Metabolism and Mutagenicity of 2-aminoanthracene by Channel Catfish Hepatic Microsomes. SETAC Annual Meeting, November 14-18, 1993, Houston, TX (with D.E. Watson).

Effect of BKME on Hepatic Porphyrin Levels and Other Biochemical Responses in Freshwater Fishes. SETAC Annual Meeting, November 14-18, 1993, Houston, TX (with K.M. Hopkins and S.W. Kennedy).

1992

Glutathione-dependent detoxification of chlorothalonil in channel catfish tissues. SOT Annual Meeting, February 23-28, Seattle, WA (with E.P. Gallagher). Toxicologist 12:393 (Abstr.).

DT diaphorase [NAD(P)H: (quinone acceptor) oxidoreductase] and quinone redox cycling in channel catfish (*Ictalurus punctatus*). SOT Annual Meeting, February 23-28, Seattle, WA (with B.M. Hasspieler). Toxicologist 12:393 (Abstr.).

Cytochrome P450 induction and genotoxicity in feral fish collected from the Niagara River ecosystem. SOT Annual Meeting, February 23-28, Seattle, WA

(with N.A. Eufemia, M.S. Kroen, D.E. Watson, T.K. Collier, and J.E. Stein). Toxicologist 12:407 (Abstr.).

Biochemical responses in brown bullhead from the Niagara River ecosystem. SETAC Annual Meeting, November 8-12, Cincinnati, OH (with N.A. Eufemia, T.K. Collier, and D.E. Watson).

Mechanisms underlying quinone-mediated oxidative stress in channel catfish (*Ictalurus punctates*). SETAC Annual Meeting, November 8-12, Cincinnati, OH (with B.M. Hasspieler).

A mechanistic approach to understanding species susceptibility to oxidative stress: a comparison of channel catfish (*Ictalurus punctates*) and brown bullhead (*Ameriurus nebulosus*). SETAC Annual Meeting, November 8-12, Cincinnati, OH (with D. Carlson and B.M. Hasspieler).

Production of 8-hydroxydeoxyguanosine *in vitro* and *in vivo* in channel catfish and brown bullhead hepatic tissue. SETAC Annual Meeting, November 8-12, Cincinnati, OH (with D.E. Watson).

1991

Studies of glutathione synthesis and turnover in channel catfish. SOT Annual Meeting, February 25 - March 1, Dallas, TX (with E.P. Gallagher). Toxicologist 11: 128 (Abstr.).

Interpretation of biomarker responses. NATO Advanced Research Workshop: "Strategy for Biomarker Research and Application in the Assessment of Environmental Health", Texel, The Netherlands, May 11-19, 1991.

The gills are an important site of glutathione metabolism and chlorothalonil detoxification in channel catfish. PRIMO 6, April 24-26, Woods Hole Oceanographic Institute, MA (with E.P. Gallagher).

NAD(P)H: quinone oxidoreductase (DT diaphorase) in channel catfish (*Ictalurus punctatus*). SETAC Annual Meeting, November 3-7, 1991, Seattle, WA (with B.M. Hasspieler).

1990

Indices of oxidative stress as biomarkers for pollutant exposure and sublethal effects. Invited paper, 14th ASTM Symposium on Aquatic Toxicology and Risk Assessment, April 22-24, San Francisco, CA.

Biochemical effects of Black Rock Harbor sediments in channel catfish. Atlantic Estuarine Research Society Annual Meeting, Virginia Institute of Marine Science, Gloucester Point, May 3-5.

The role of *in vitro* studies in ecological hazard assessments. Invited paper, "The Population Ecology and Wildlife Toxicology of Agricultural Pesticide Use: A Modeling Initiative for Avian Species." July 22-27, Kiawah Island, S.C., sponsored by the Society of Environmental Toxicology and Chemistry (with E.P. Gallagher and C. Habig).

Antioxidant responses in the wedge clam (*Rangia cuneata*) exposed to t-butyl hydroperoxide and elevated oxygen. SETAC Annual Meeting, November 11-15, 1990, Arlington, VA (with P.C. Darby).

The mutagenicity of Black Rock Harbor sediments in the *Salmonella*/microsome assay: a comparison of the metabolic capability of the liver S9 fraction of rat and channel catfish. SETAC Annual Meeting, November 11-15, 1990, Arlington, VA (with J.S. Volosin, D.A. Pagano, and F.W. Kari).

Use of depleting agents in studies of glutathione turnover, subcellular distribution, and detoxification of cholorothalonil in channel catfish. SETAC Annual Meeting, November 11-15, 1990, Arlington, VA (with E.P. Gallagher).

1989

Biochemical and peroxisomal proliferating effects of bleached kraft pulp and paper mill effluent in channel catfish. SOT Annual Meeting, February 26 - March 1, Atlanta, GA (with E. Mather-Mihaich). Toxicologist 9:65 (Abstr.).

Phase I and phase II biotransformation enzyme activities in channel catfish exposed to contaminated sediments. SOT Annual Meeting, February 26 - March 1, Atlanta, GA (with C. Habig and T. Wolfe). Toxicologist 9:43 (Abstr.).

Oxyradicals and antioxidant defenses: an environmental perspective. Invited paper for the Annual Biomedical Sciences Symposium, Wright State University, Dayton, OH, May 19; Interdepartmental Plant Physiology Seminar Series, Virginia Tech, Blacksburg, VA, April 13; and Ecotoxicology Mini-symposium on Environmental Pollutants and Biomarkers, Duke University, May 17.

Biochemical characteristics of cholinesterases in aquatic organisms. Invited paper, SETAC Annual Meeting, October 29 - November 2, 1989, Toronto, Ontario (with C. Habig).

Effects of 2,4-D and picloram on monooxygenase, glutathione s-transferase, and peroxisomal enzyme activities in channel catfish liver. SETAC Annual Meeting, October 29 - November 2, 1989, Toronto, Ontario (with E.P. Gallagher).

Peroxisomal enzyme, mixed-function oxidase and oxidant-mediated responses of chlorinated phenolics and resin acids in channel catfish. SETAC Annual Meeting, October 29 - November 2, 1989, Toronto, Ontario (with E. Mather-Mihaich).

Oxidant-mediated responses as indices for environmental contamination. Invited paper, Pacifichem (The 1989 International Chemical Congress of Pacific Basin Societies), December 17-22, Honolulu, HI.

1988

Redox cycling and oxidative stress in aquatic animals. Invited paper, Southeastern Regional Chapter, Society of Toxicology, June 24-25, Knoxville, TN.

Free radical-mediated effects in channel catfish exposed to contaminated sediments. SETAC Annual Meeting, November 13-17, 1988, Arlington, VA. (with C. Habig).

1987

Mixed function oxidase activity in brown bullhead from a contaminated Neuse River estuary. SOT Annual Meeting, February 23-27, Washington, D.C. (with E.P. Gallagher). Toxicologist 7:149 (Abstr.)

Nitroaromatic catalysis of superoxide generation in three species of freshwater fish. SOT Annual Meeting, February 23-27, Washington, D.C. (with P.C. Washburn). Toxicologist 7:19 (Abstr.)

Effects of paraquat on microsomal oxygen reduction and antioxidant enzymes in the hepatopancreas of two mid-Atlantic bivalve molluscs. SOT Annual Meeting, February 23-27, Washington, D.C. (with R.J. Wenning). Toxicologist 7:149 (Abstr.).

In vivo and in vitro effects of the cotton defoliant DEF on catfish acetylcholinesterase. SOT Annual Meeting, February 23-27, Washington, D.C. (with C. Habig). Toxicologist 7:19 (Abstr.).

Toxicity of paraquat in the chicken embryo. SOT Annual Meeting, February 23-27, Washington, D.C. (with H.T. Williams). Toxicologist 7:1 (Abstr.).

Effects of atmospheric deposition on red spruce: a free radical-based approach. National Acid Precipitation Assessment Program Peer Review, March 8-13, Atlanta, GA (with C. J. Richardson).

Nitroaromatic stimulation of superoxide production in three species of freshwater fish. PRIMO 4, April 22-24, 1987, Woods Hole, MA (with P.C. Washburn).

The anticholinesterase effect of the cotton defoliant S, S, S tri-n-butyl phosphorotrithioate (DEF) on channel catfish. PRIMO 4, April 22-24, 1987, Woods Hole, MA (with C. Habig).

The effects of paraquat on microsomal oxygen reduction and antioxidant defenses in ribbed mussels (*Guekensia demissa*) and wedge clams (*Rangia cuneata*). PRIMO 4, April 22-24, 1987, Woods Hole, MA (with R. J. Wenning).

Isozymes of superoxide dismutase in red spruce and their importance in protecting against oxidative stress. US/FRG Symposium, "The Effects of Atmospheric Pollutants on the Spruce-Fir Forests of the Eastern United States and the Federal Republic of Germany", October 10-23, Burlington, VT (with N.E. Tandy and C.J. Richardson).

Biochemical responses in aquatic organisms: a review plus recent studies on oxidative stress. SETAC Annual Meeting, November 9-12, Pensacola, FL (with P.C. Washburn, R.J. Wenning, C.S. Jewell, and G.W. Winston).

Interactive effects of copper, iron and paraquat on in vitro lipid peroxidation in channel catfish liver. SETAC Annual Meeting, November 9-12, Pensacola, FL (with E. P. Gallagher).

Oxidant and mixed function oxidase mediated responses in channel catfish exposed to bleached kraft mill effluent. SETAC Annual Meeting, November 9-12, Pensacola, FL (with E. Mather-Mihaich).

Tissue distribution and depuration kinetics of the cotton defoliant DEF in channel catfish. SETAC Annual Meeting, November 9-12, Pensacola, FL (with C. Habig).

Inhibition of superoxide dismutase in red spruce by hydrogen peroxide: a possible factor in increased susceptibility to oxidative stress from pollutants. SETAC Annual Meeting, November 9-12, Pensacola, FL (with N.E. Tandy and C.J. Richardson).

1986

Heavy metals in peatland waters. Invited paper, North Carolina Section of the American Water Resources Association Annual Meeting, January 9, Durham, NC.

Nitroaromatic stimulation of superoxide production by channel catfish (*Ictalurus punctatus*) hepatic microsomes. SETAC Annual Meeting, November 2-6, Alexandria, VA (with P.C. Washburn).

Toxicity of paraquat in the chicken embryo. SETAC Annual Meeting, November 2-6, Alexandria, VA (with H.T. Williams).

Comparative effects of organophosphorous pesticides on catfish and blue crab acetylcholinesterase. SETAC Annual Meeting, November 2-6, Alexandria, VA (with C.R. Habig).

1985

Occurrence of heavy metals in wintering waterfowl and their toxicological significance. "Waterfowl in Winter", a conference sponsored by the Wildlife Management Institute. January 7-10, 1985, Galveston, TX.

Mechanistic studies in wildlife toxicology. Invited paper, SETAC Annual Meeting, November 10-13, St. Louis, MO.

Naphthoquinone-induced oxygen toxicity in channel catfish. SETAC Annual Meeting, November 10-13, St. Louis, MO (with A.A. Andaya).

Oxidant related effects of DEF and n-butyl mercaptan on channel catfish. SETAC Annual Meeting, November 10-13, St. Louis, MO (with E.L. Mather).

Inactivation and recovery of fish acetylcholinesterase. SETAC Annual Meeting, November 10-13, St. Louis, MO (with C.R. Habig).

Comparative effects of DEF on catfish and blue crabs. SETAC Annual Meeting, November 10-13, St. Louis, MO (with C.R. Habig).

Paraquat toxicity in the chicken embryo. North Carolina Society of Toxicology Annual Meeting, Research Triangle Park, NC, and SETAC, St. Louis, MO (with H.T. Williams).

1984

Diquat induced free radical toxicity in bluegill sunfish (*Lepomis macrochirus*). SETAC Annual Meeting, November 4-7, Arlington, VA (with T. Mohin).

Free radical toxicity: potential basis for the assessment of the effects of complex effluents on aquatic organisms. Carolina Power and Light Company, Biology Seminar Series, November 21, 1984, Apex, NC.

1983

Physiological and ecological influences of heavy metals on wildlife. Pp. 121-129 in Kacmar, P., and J. Legath (eds.). Czechoslovak-American Symposium on Toxic Effects of Chemical Environmental Contaminants upon Production and Reproductive Ability in Free-living Animals. Strbske-Pleso, Czechoslovakia, October 2-4.

Effects of cadmium ingestion and food restriction on energy metabolism and tissue metal concentrations in mallard ducks (*Anas platyrhynchos*). SETAC Annual Meeting, November 6-9, Arlington, VA (with P.F. Scanlon).

1982

Heavy metals in Chesapeake Bay waterfowl. Wilson Ornithological Society, Blacksburg, VA (with P.F. Scanlon).

Heavy metals in benthos and sediments from the Chesapeake Bay region. Virginia Academy of Science, Blacksburg, VA (with J. van Montfrans and P.F. Scanlon).

1981

Studies in wildlife toxicology: interfacing field and laboratory approaches. SETAC Annual meeting, November 22-25, Arlington, VA (with R.J. Kendall and P.F. Scanlon).

Effects of cadmium ingestion and food restriction on energy metabolism and its endocrine control in Japanese quail. Virginia Journal of Science 32:90 (Abstr.). (with V.E. Kopf, P.F. Scanlon, and F.C. Gwazdauskas).

Heavy metal concentrations in tissues of ducks wintering in the lower Chesapeake Bay region. Transactions of the Northeast Section of the Wildlife Society 38:111-112 (Abstr.). (with P.F. Scanlon).

GRANTS

Previous:

Effects of Peatland Drainage on Mercury Dynamics in Eastern North Carolina. University of North Carolina Water Resources Research Institute. July 1, 1983 - June 30, 1984. $35,840 (with D.W. Evans, Co-PI).

Mechanisms of Paraquat Toxicity in Avian Embryos. Duke University Research Council. July 1, 1983 - June 30, 1984. $3,135.

An Ecotoxicology Research Program at Duke University. Andrew W. Mellon Foundation. July 1, 1984 - June 30, 1987. $125,000 (with C.J. Richardson, Co-PI).

The Assessment of Impacts of Complex Effluents on Aquatic Organisms: An Oxygen Toxicity-Based Methodology. US-EPA. July 1, 1985 - June 30, 1987. $60,267.

Oxidant/Free Radical Mediated Effects of Complex Effluents on the Bluegill (*Lepomis macrochirus*): A Preliminary Study with Pure Compounds. September 1, 1984 - June 30, 1986. University of North Carolina Water Resources Research Institute, $4,800; Duke University Marine Biomedical Center, $4,400; Duke University Research Council, $6,200; North Carolina Office of Science and Technology, $5,000.

Effects of Acid Precipitation and Associated Gases on Red Spruce: A Free Radical-Based Approach. US-EPA. January 1, 1986 - December 31, 1987. $191,613 (with C.J. Richardson, Co-PI).

Effects of Gaseous Pollutants on Open-top Chamber Seedlings in Duke Forest: Physiology and Biochemistry. US-EPA and USDA. March 1, 1986 - February 28, 1988. $168,202 (with C.J. Richardson, PI).

Comparative Neurobiology of Acetylcholinesterase in Channel Catfish and Blue Crabs. The Whitehall Foundation. November 1, 1986 - October 31, 1988. $34,850.

Biochemical and Genotoxic Correlates of Carcinogenesis in Aquatic Organisms Exposed to Contaminated Sediments. Duke University Research Council, July 1, 1987 - June 30, 1988. $5,000.

Glutathione Metabolism and Utilization in the Channel Catfish, *Ictalurus punctatus*. Marine Biomedical Center, Duke University, June 1 - August 31, 1988. $3,000.

Oxidative DNA Damage in Aquatic Animals: Biomarkers for Environmental Contamination. North Carolina Biotechnology Center. June 1, 1990 - November 30, 1991. $24,973

Biomarkers for Redox-active Genotoxins in Contaminated Sediments: A Mechanistic Approach. U.S. Geological Survey and the University of North Carolina Water Resources Research Institute. July 15, 1990 - December 15, 1992. $117,056.

Biomarkers for Sediment-Associated Genotoxins in Benthic Fish. U.S. EPA. August 1, 1990 - August 1, 1993. $218,963. (L. Shugart and U. Varanasi, Co-PI's.)

Glutathione Metabolism and Utilization in the Channel Catfish, *Ictalurus punctatus*. U.S. EPA. October 1, 1990 - September 30, 1994. $192,567

Biomarkers for Oxidative Stress in Aquatic Animals. U.S. EPA. October 1, 1990 - September 31, 1992. $39,000.

Genotoxic Responses in Bottom-dwelling Fish Exposed to Nitrogen-substituted Aromatic Hydrocarbons (NSAHs). Exxon Corporation. July 1, 1992 - August 31, 1993. $15,000.

Biomarkers for Bleached Kraft Mill Exposures and Effects in Aquatic Animals. September 1, 1992 - December 31, 1994. $79,456. University of North Carolina Water Resources Research Institute.

Comparative Mechanisms of Polycyclic Aromatic Hydrocarbon Metabolism in the Channel Catfish and the Brown Bullhead. January 1 - December 31, 1994. $30,000. Exxon Corporation.

In Vitro Methods for Screening and Evaluating Reproductive Impacts of Aquatic Pollutants on Fish. July 1, 1995 - December 31, 1996. $39,935. University of North Carolina Water Resources Research Institute.

The Effects of Xenobiotics on Apoptosis and Development in *Fundulus heteroclitus*. June 1, 1996 - May 31, 1997. $9,400. The Duke Marine and Freshwater Biomedical Center (with B. Toomey, PI).

Mechanisms of Adaptation in a Hydrocarbon-exposed Population of *Fundulus heteroclitus*. May 1, 1997 - April 30, 1998. $14,000. Duke University Marine and Freshwater Biomedical Center.

Effects of Xenobiotics on Reproduction and Development in Aquatic Animals. January 1, 1995 - August 31, 1998. $150,000. Exxon Corporation.

Comparative Mechanisms of Hydrocarbon Metabolism and Genotoxicity in Two Ictalurid Fishes. October 1, 1994 - September 30, 1998. $290,973. U.S. EPA.

Comparative Mechanisms of Phase II Metabolism of Benzo[a]pyrene in Two Species of Ictalurid Catfish. May 1, 1998 – April 30, 1999. $13,600. The Duke Marine and Freshwater Biomedical Center.

Reproductive Consequences to Fish of Exposure to Estrogenic Chemicals in the Environment. Unrestricted gift, effective July 1, 1997. $35,000. Procter and Gamble Company.

Role of the Tumor Suppressor Gene p53 in PAH and Oxidant-mediated Liver Carcinogenesis in the Cancer Sensitive Brown Bullhead (*Ameriurus nebulosus*). April 1 – December 31, 2000. $11,500. Duke Marine/Freshwater Biomedical Center.

Characterization of CYP1B1 Gene Activation in Fish for Use as a Possible Marker of Cancer Resistance. July 1, 2000 – December 31, 2001. $40,000. North Carolina Biotechnology Center.

Collaborative Research Training in Environmental Toxicology. June 1, 1998 – May 31, 2001. $1,206,394 (with E.D. Levin, PI, and T.A. Slotkin, Co-PI). U.S. EPA.

Comparative Mechanisms of Benzo[a]pyrene Metabolism and DNA Repair in Two Species of Ictalurid Catfish. October 1, 1998 – September 30, 2003. $314,023. U.S. EPA.

Adaptation of a Population of *Fundulus heteroclitus* to a Creosote-contaminated Environment: Mechanisms, Genetic Consequences and Fitness Trade-offs. March 1, 2000 – February 28, 2004. $321,447. Office of Naval Research.

Superfund Chemicals Impact on Reproduction and Development (a Superfund Basic Research Center). June 1, 2000 – March 31, 2005. $6,531,856 (with T.A. Slotkin, Co-PI). National Institute of Environmental Health Sciences (NIEHS).

Markers for Chemical Mixtures in *Fundulus heteroclitus*. NIEHS (a project within the Superfund Basic Research Center, above). June 1, 2000 – March 31, 2005. $801,983. NIEHS.

Emerging Molecular and Computational Approaches for Cross-Species Extrapolations. A Joint SETAC/SOT Workshop, July 18-23, 2004. Portland, OR. $38,500. NIEHS.

Integrated Toxicology Program. July 1, 2001 – June 30, 2006. $2,464,542. NIEHS.

Superfund Chemical Impacts on Development (Superfund Basic Research Center, second funding cycle – R. Di Giulio, PI and Center Director). April 1, 2005 – March 31, 2011. $9,570,643. NIEHS. P42 ES-010356.

Developmental Effects of Superfund Hydrocarbon Mixtures in *Fundulus heteroclitus* (a project within the Superfund Basic Research Center, above). April 1, 2005 – March 31, 2011. $1,479,036. NIEHS.

Administrative Core for the Superfund Basic Research Center. April 1, 2005 – March 31, 2011. $432,762. NIEHS.

Research Translation Core for the Superfund Basic Research Center. April 1, 2005 – March 31, 2011. $392,113. NIEHS (with ML Miranda, PI).

Center for the Comparative Biology of Vulnerable Populations (an Environmental Health Sciences Research Center) - R. Di Giulio, PI and Center Director. April 1, 2004 – March 31, 2011. $2,447,138. NIEHS. P30-ES-01356.

Administrative Supplement, Center for the Comparative Biology of Vulnerable Populations - R. Di Giulio, PI and Center Director. October 1, 2009 – March 31, 2011. $311,142. NIEHS. P30-ES-01356.

The Bioassay Network for Improved Assessments of Contaminated Sediments: A Superfund Research Program – U.S. EPA Collaboration. R. Di Giulio, PI. September 15, 2009 – March 31, 2011. NIEHS. $75,272.

Mechanisms of Cancer-resistance in a Population of *Fundulus heteroclitus* Inhabiting a Superfund-impacted Estuary. R. Di Giulio, PI. September 15, 2009 – August 31, 2012. NIEHS. $193,935.

Center for Environmental Implications of Nanomaterials. PI: M. Wiesner. R. Di Giulio: Co-PI and Theme Leader, Cellular and Organismal Responses. Other Co-PIs: M.F. Hochella, K.L. Jones, and G.V. Lowry. October 1, 2008 – September 30, 2013. NSF EF-0830093. $14,375,003.

Influence of Chelating Ligands for the Aggregation, Dissolution and Bioavailability of Soluble Nanomaterials. H. Hsu-Kim, PI; R. Di Giulio and C. Matson, Co-PIs. May 1, 2011 – April 30, 2014. NSF CBET-1066781. $337,419.

Environmental Impacts of Mountaintop Coal Mining in West Virginia. PI: R.T. Di Giulio. June 1, 2009 – May 31, 2015. Foundation for the Carolinas. $1,650,000.

Risk Assessment for Manufactured Nanoparticles Used in Consumer Products. J. Zhang, Duke University, PI. July 1, 2010 – June 30, 2015. U.S. EPA (Joint US-UK Research Program). $1,999,995; Duke subcontract - $254,608 for July 1, 2013 – June 30, 2015.

Legacy Impacts of Coal Combustion Residues on Freshwater Ecosystems in North Carolina. PI: R. Di Giulio; Co-PIs: E. Bernhardt, H. Hsu-Kim, and A. Vengosh.

Water Resources Research Institute of the University of North Carolina System. March 1, 2015 – February 28, 2016. $60,000.

PCBs in Game fish and Atlantic Killifish in the Elizabeth River system, Virginia: Sources, Spatial Distribution, Stakeholder Engagement, and implications for health and management. Administrative Supplement to the Duke Superfund Research Center. PI: R. Di Giulio. June 1, 2014 – May 31, 2016. NIEHS. $163,622.

Developmental Toxicants: Mechanisms, Consequences and Remediation (Superfund Research Center, third funding cycle – R. Di Giulio, PI and Center Director). April 1, 2011 – March 31, 2017. NIEHS. $12,899,235.

Developmental PAH exposures in fish: Mechanisms of toxicity, adaptation and later life consequences (a project within the Superfund Research Center, above). April 1, 2011 – March 31, 2017. NIEHS. NIEHS. $2,217,135.

Administrative Core for the Superfund Basic Research Center. R. Di Giulio, PI. April 1, 2011 – March 31, 2017. NIEHS. $1,009,222.

Current:

Leon Goldberg Fellowship in Toxicology (a post-doctoral training grant). R.T. Di Giulio, PI. September 1, 2013 – December 31, 2017. R.J. Reynolds Tobacco Company. $286,448.

University Program in Environmental Health (a T-32 doctoral training grant). R. Di Giulio, PI, S. Patierno, Co-PI. July 1, 2013 – June 30, 2018. NIEHS. $1,205,672.

Center for Environmental Implications of Nanomaterials. PI: M. Wiesner; Co-PIs: R.T. Di Giulio, M.F. Hochella, K.L. Jones, and G.V. Lowry. October 1, 2013 – September 30, 2018. NSF. $15,000,000.

Chemical mixture toxicity of well water: investigating the potential role of pollutant mixtures in well water as a root cause for chronic kidney disease in Sri Lanka. Co-PIs: R.T. Di Giulio, N. Jayasundara, and T. Ostbye. January 15, 2017 – January 14, 2018. Duke Global Health Institute. $25,000.

Progressive loss of chemical resistance in pollution-adapted Atlantic killifish. Co-PI’s: R.Di Giulio, C. Weinhouse, N. Jayasundara, S. Murphy, J. Meyer. March 1, 2017 – September 30, 2019. Triangle Center for Evolutionary Medicine. $20,000.

Developmental Exposures: Mechanisms, Outcomes and Remediation (Superfund Research Center, fourth funding cycle – R. Di Giulio, PI and Center Director). April 1, 2017 – September 30, 2022. NIEHS. $10,150,450.

Mechanisms and Consequences of Evolved Adaptation to Environmental Pollution (a project within the Superfund Research Center, above). April 1, 2017 – September 30, 2022. NIEHS. $1,183,430.

Administrative Core for the Superfund Basic Research Center. R. Di Giulio, PI. April 1, 2017 – September 30, 2022. NIEHS. $691,650.

In review:

Interactive Effects of Petroleum and Hypoxia on Reproduction, Development, Energetics and Epigenetics in Marine Fishes. PI: M. Rahman (University of Texas Rio Grande Valley); Co PIs: P. Thomas (University of Texas at Austin) and R. Di Giulio (Duke University). January 1, 2018 – December 31, 2019. Gulf of Mexico Research Initiative. $977,832 requested.